

Platform Screen Doors System

Line and Workshop Maintenance

Contents

1. General

- 1.1 PSD&PED system line maintenance tasks
- 1.2 PSC Display and PAS software description
- 1.3 Guidelines for O&M manual use
- 1.4 Maintenance applicable documents

2. Safety guidelines

- 2.1 Safety precautions during intervention
- 2.2 Hazard analysis
- 2.3 Emergency cases

3. Specific tools and equipment

- 1. General**
- 2. Safety guidelines**
- 3. Specific tools and equipment**

1.1 PSD&PED system line maintenance tasks

*Corrective
maintenance*



*Preventive
maintenance*



Troubleshooting



Functional check



*Workshop
maintenance*



Corrective maintenance

Preliminary actions prior to intervention	On-site actions	Forward actions post to intervention
<ul style="list-style-type: none">• Fill up an information form during service call out. Assess the means of maintenance to put in place:<ul style="list-style-type: none">- Qualification required and number of competent personnel- Preliminary intervention notice if any stoppage is necessary during the testing session.- Mean time to repair must be estimated• Prior to on site intervention, collect all ancillaries, spare parts and special tooling in compliance with the troubleshooting, dismounting and functional check sections of the O&M manual.		

Corrective maintenance

Preliminary actions prior to intervention	On-site actions	Forward actions post to intervention
<ul style="list-style-type: none">• Follow work instruction instructions in particular those regarding safety.• Replace what is strictly necessary for keeping the system in good order. If preliminary signs of fracture, wear or the like resulting from original failure are detected, preventive actions shall as well be undertaken to change indicated part(s).• Minimise the rate of disability on the system operation caused by repairs.		

Corrective maintenance

Preliminary actions prior to intervention	On-site actions	Forward actions post to intervention
<ul style="list-style-type: none">• Report intervention results plus following actions to undertake if the system service can not be fully restored.• Send back faulty DCU, motor unit and other electronic device, to FAIVELEY Hong Kong subsidiary for a complete checkup.		

Preventive maintenance

Routine visit	Equipment inspection	Equipment upkeep	Exchange of parts	Periodical functional check
<ul style="list-style-type: none">• Carry out weekly routine visits on platform and in technical rooms to make sure the facilities are in good order and that no sign of degradation is declared.				

Preventive maintenance

Routine visit	Equipment inspection	Equipment upkeep	Exchange of parts	Periodical functional check
<ul style="list-style-type: none">• Every ten years, carry out a full inspection of the leaves and door operators to check that no sign of mechanical failure resulting from wear, seizing or fracture is developing. If need be, trim the geometry for each leaf.				

Preventive maintenance

Routine visit	Equipment inspection	Equipment upkeep	Exchange of parts	Periodical functional check
<ul style="list-style-type: none">• Periodically clean a limited number of components to keep the whole plant neat and prevent mishaps consecutive to dust or solid deposit.• Periodically lubricate the rolled screw of the mechanism to avoid possible jamming or premature wear.				

Preventive maintenance

Routine visit	Equipment inspection	Equipment upkeep	Exchange of parts	Periodical functional check
<ul style="list-style-type: none">• Exchange parts of the door operator, the PSC and the PEL whose mechanical life can not withstand to the number of O/C cycles required for the PSD/PED system in 35 years of operation.				

Preventive maintenance

Routine visit	Equipment inspection	Equipment upkeep	Exchange of parts	Periodical functional check
				<ul style="list-style-type: none">• Periodically check door operation and manual release for each DCU and if need be, trim the parameter drift.• Every five years, perform an electrical insulation test of the whole platform facade. If need be, proceed to a fault finding immediately after (<i>track is not energized and no train stands at platform</i>).

Troubleshooting

Diagnosis	Safety	Guidelines
<ul style="list-style-type: none">• Use your PSD/PED system know-how to locate and identify a shortlist of possible failure modes, prior to intervention on site. It is recommended to fill a form as reminder and follow a specific questionnaire on the phone to make sure no essential information is missing (e.g alarm, MCS data, operator action carried out)• Sharpen your diagnosis prior to dismounting, by collecting clues on maintenance aid computer.		

Troubleshooting

Diagnosis	Safety	Guidelines
<ul style="list-style-type: none">• Inhibit circuit/Isolate subsystem in order to bypass/neutralize (<i>at last resort</i>) one part of the system and test each suspected component.		

Troubleshooting

Diagnosis	Safety	Guidelines
		<ul style="list-style-type: none">• Proceed immediately to repair if all ancillaries, spare part(s) and tooling collected fit the case.• If need be, require FAIVELEY's technical backup. This applies in particular when the component involved can not be tested by MTRC on manufacturer's demand (e.g power supply PCBs, DCU, MCSI software).

Functional check

Electromechanics

Electricity

Electronics

- Check the functionalities of the PSD/PED doorset(s) (e.g automatic O/C, obstacle detection, manual release) partially or thoroughly, depending at which scale the intervention is undertaken. It includes a good mechanical behaviour of the leaves, a proper work of the DCU(s), a consistent display on laptop computer of the PSCD data.
- Check the functionalities of the manual intervention box if it has been replaced. It includes a proper work of the DCUs and a consistent display on laptop computer of the PSCD data.
- Check the functionalities of the EED or MSD (e.g automatic reclosing, manual release) partially or thoroughly, depending at which scale the intervention is undertaken. It includes a good mechanical behaviour of the leaves and a consistent display on laptop computer of the PSCD data.

Functional check

Electromechanics

Electricity

Electronics

- Verify if all circuits at EPS/UPS work well and are energized, when the cubicle is restarted.
- Check if all power supply emergency device are still fully operational (e.g batteries, multithreshold relays).

Functional check

Electromechanics

Electricity

Electronics

- Verify for each MCSI module, the LED status indicators indicate a nominal operation mode.

Guidelines

- Replace damaged SRU and all components to discard as specified in workshop work instructions.
- Adjust the SRU(s) on the LRU in compliance with drawing and check LRU functionalities with workshop test bench(es).
- Once recovered, the LRU is stacked up in the spare units stock.

1.2 PSC Display and PAS software description

A. PSCD - PSC Display

PSCD software description



PSCD during standard operation



PSCD troubleshooting aid



B. PAS - Parameter Adjustment Software

PAS software description



Parameter adjustment:
Obstacle detection



Parameter adjustment:
Automatic opening mode



Parameter adjustment:
Automatic closing mode



PSCD software description



AEL2 : KOWLOON STATION

MAIN MENU

Date: 18/02/1997

Time: 09:48

STATION
ALARM / STATUS

DOOR
CONFIGURATION

RECORD LISTS

ALARM LIST

EVENT LIST

Shift F1
RETURN
WIN 95

F8
HELP

AEL2 : KOWLOON STATION

STATION ALARM / STATUS

Date: 18/02/1997

Time: 09:50

TRACKS - ALARMS

UP DOWN

- PSD/EED open alarm
- PSD close alarm
- PSD/EED interlock override
- PED open alarm
- PED close alarm
- PED interlock override
- Drive power fault

PSD/PED SYSTEM ALARM

- Monitoring System fault
- Power failure
- UPS failure

TRACKS - STATUS

UP DOWN

- OPEN PSD command
- CLOSE PSD command
- OPEN PED command
- CLOSE PED command
- PSL doors close command
- PSL doors open command
- Selective re-open command
- Trackside access MSD open status
- PSD lamp failure
- PED lamp failure

F1
RETURN
MAIN MENU

F8
HELP

AEL2 : KOWLOON STATION

UPTRACK

Date: 18/02/1997

Time: 09:52



FIRST SELECT A LEAF

F1
RETURN
MAIN MENU

F2
DOOR LEAF
STATUS

F3
TIME
TREND

F4
CURRENT
TREND

F5
DOORSET
COUNTERS

F7
DOWN-
TRACK

F8
HELP

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input checked="" type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input checked="" type="checkbox"/>	- Leaf Locked Switch	<input checked="" type="checkbox"/>	- In leaf state
<input checked="" type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input checked="" type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input checked="" type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP

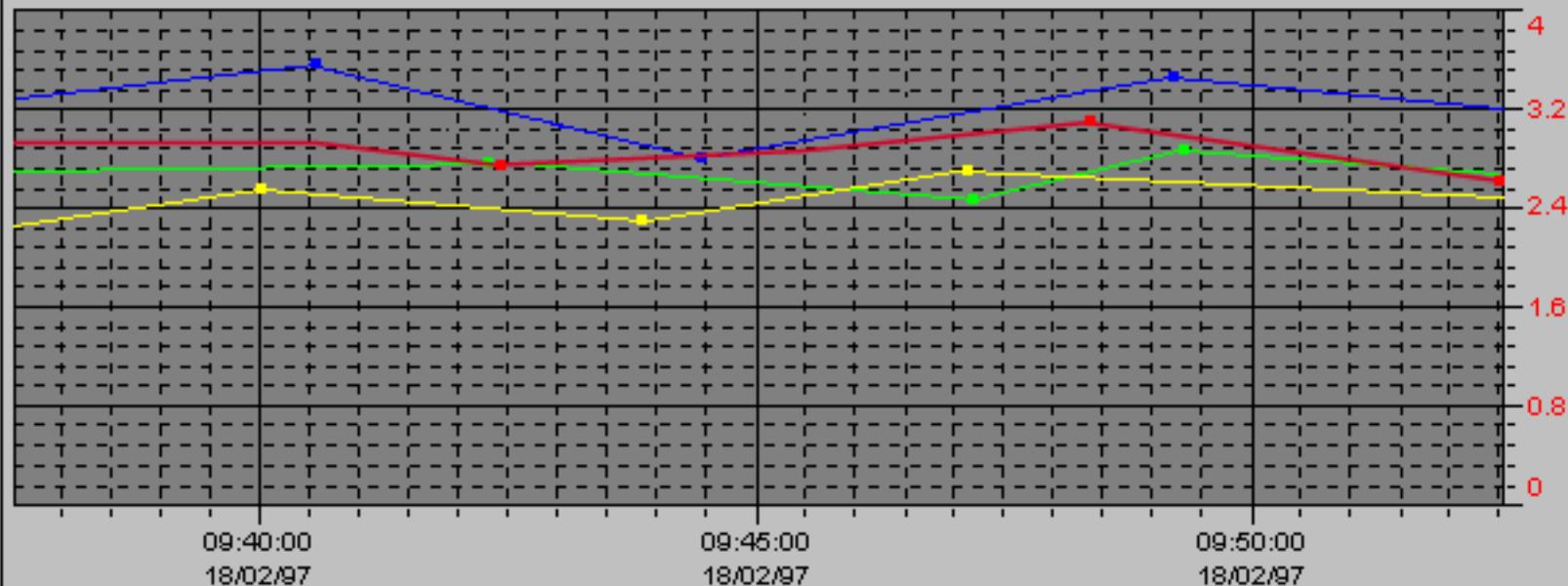


AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

TIME TRENDS

Date: 18/02/1997
Time: 09:54



2.6 s Opening time
 3.2 s Closing time
 550 ms Opening dampening time
 1050 ms Closing dampening time

Selected pen
 4 trends selection

Tue Feb 18 09:52:33 1997

Oldest Data Scroll Backward Newest Data
 Time Range (hours)

F1
RETURN
UPTRACK

F8
HELP

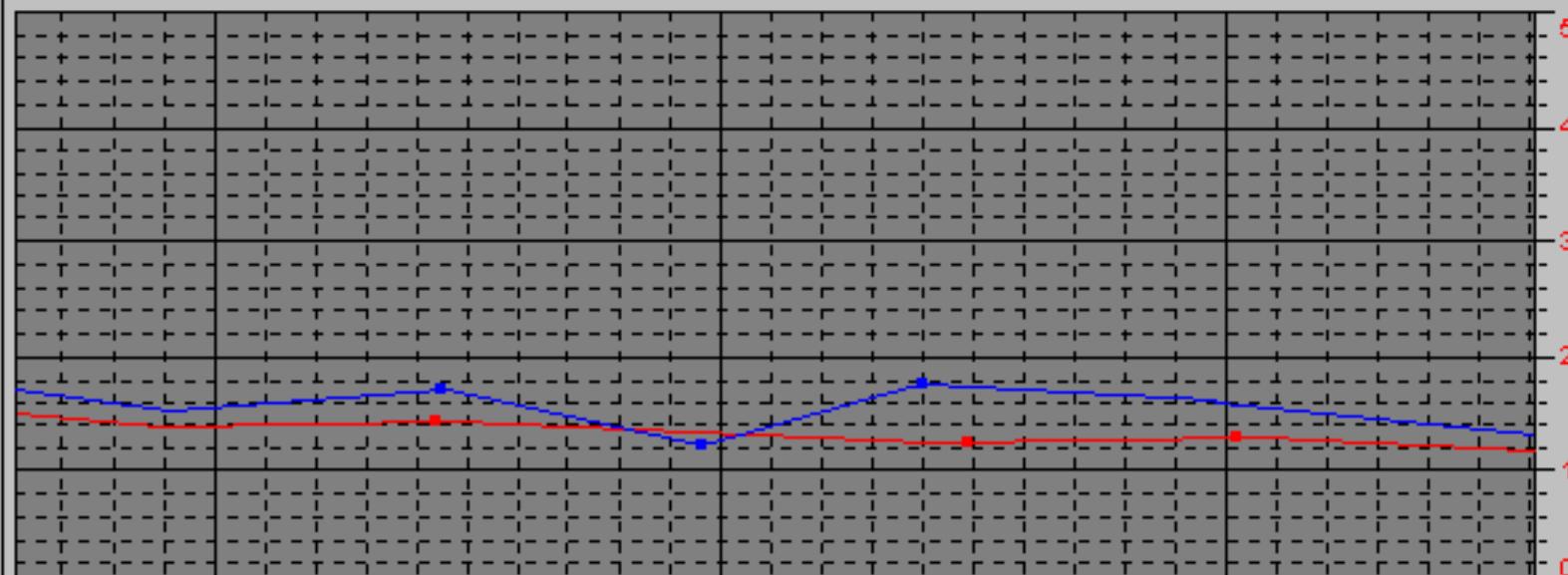
AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

CURRENT TRENDS

Date: 18/02/1997

Time: 09:54



1.15

A Opening motor average current

1.30

A Closing motor average current

Tue Feb 18 09:53:03 1997

Selected
pen

2 trends
selection



Oldest
Data

Scroll
Backward

0.25

Time Range (hours)

12

0.25

Scroll
Forward

Newest
Data



F1
RETURN
UPTRACK

F8
HELP

AEL2 : KOWLOON STATION

PSD 05L UPTRACK

DOORSET COUNTERS

Date: 18/02/1997

Time: 09:55

DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Cycle / h. max	35	37	30	35	27	20	30	37	35	26	30	35	30	37	35
Cycle / day	295	310	290	295	311	285	320	295	290	285	295	285	320	290	295

DAY	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cycle / h. max	26	27	35	32	33	27	35	35	32	33	27	28	35	35	28	27
Cycle / day	285	290	285	287	310	310	290	310	300	285	290	287	320	287	300	290

Cycles / hour

285

Cycles from start / up

780792

Uptrack counter doors

6926032

F1
RETURN
UPTRACK

F8
HELP

AEL2 : KOWLOON STATION

ALARM LIST

Date: 18/02/1997
Time: 10:38

DESIGNATION	ORIGIN	DD / MM	HH:MM:SS	ALARM / STATUS
drive power fault	Uptrack	18/ 02	10/ 37 /57	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /55	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /54	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /52	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /51	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /50	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /48	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /47	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /46	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /44	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /43	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /41	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /40	APPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /39	DISAPPEARS
drive power fault	Uptrack	18/ 02	10/ 37 /38	APPEARS

F1
RETURN
MAIN MENU

F8
HELP

AEL2 : KOWLOON STATION

EVENT LIST

Date: 18/02/1997
Time: 10:38

DESIGNATION	ORIGIN	DD / MM	HH:MM:SS	EVENT / STATUS
PSL doors open command	Uptrack	18/ 02	10/ 34/51	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/49	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/48	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/47	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/46	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/44	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/43	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/42	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/41	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/39	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/38	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/36	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/36	APPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/34	DISAPPEARS
PSL doors open command	Uptrack	18/ 02	10/ 34/33	APPEARS

F1
RETURN
MAIN MENU

F8
HELP

Open command

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997

Time: 09:53

<input type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input checked="" type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input type="checkbox"/>	- Leaf Locked Switch	<input type="checkbox"/>	- In leaf state
<input type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input checked="" type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

Open command
final display

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP

Close command

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997

Time: 09:53

<input checked="" type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input checked="" type="checkbox"/>	- Leaf Locked Switch	<input checked="" type="checkbox"/>	- In leaf state
<input checked="" type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input checked="" type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input checked="" type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

Close command

final display

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTTRACK

F8
HELP

Local control

AEL2 : KOWLOON STATION

PSD 05L UPTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

	- Close command		- Close local
	- Open command		- Manual release
	- Re-open command		- EED unlocked
	- Leaf Locked Switch		- In leaf state
	- Leaf Closed Switch		- In leaf obstacle detection
	- Other Leaf Locked Switch		- Lamp failure
	- Local control		
	- Open local		

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input checked="" type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

Local Open command display

- Opening time : s.

- Closing time : s.

- Opening dampening time : **950** ms.

- Closing dampening time : 1050 ms.

- Opening motor average current : 1.15

A. - Closing motor average current : 1.30 A.

F1
RETURN
UPTRACK

F8
HELP



Manual release

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input checked="" type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input type="checkbox"/>	- Leaf Locked Switch	<input checked="" type="checkbox"/>	- In leaf state
<input type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input checked="" type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input checked="" type="checkbox"/>	- Manual release mode

Manual release
case display

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTTRACK

F8
HELP

Obstacle detection (1)

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input checked="" type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input type="checkbox"/>	- Leaf Locked Switch	<input checked="" type="checkbox"/>	- In leaf state
<input type="checkbox"/>	- Leaf Closed Switch	<input checked="" type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input checked="" type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

Obstacle detection
case display

- Opening time : **2.6** s. - Closing time : **3.2** s.
- Opening dampening time : **950** ms. - Closing dampening time : **1050** ms.
- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP



Obstacle detection (2)

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input type="checkbox"/> - Close command	<input type="checkbox"/> - Close local
<input type="checkbox"/> - Open command	<input type="checkbox"/> - Manual release
<input checked="" type="checkbox"/> - Re-open command	<input type="checkbox"/> - EED unlocked
<input type="checkbox"/> - Leaf Locked Switch	<input checked="" type="checkbox"/> - In leaf state
<input type="checkbox"/> - Leaf Closed Switch	<input type="checkbox"/> - In leaf obstacle detection
<input type="checkbox"/> - Other Leaf Locked Switch	<input type="checkbox"/> - Lamp failure
<input type="checkbox"/> - Local control	
<input type="checkbox"/> - Open local	

DOOR LEAF STATUS

<input type="checkbox"/> - Door leaf proven closed	<input type="checkbox"/> - Drive fault
<input type="checkbox"/> - Door leaf fully opened	<input type="checkbox"/> - Time out
<input checked="" type="checkbox"/> - Door leaf in re-opening	<input type="checkbox"/> - Obstacle detection (closing)
<input type="checkbox"/> - Isolated door	<input type="checkbox"/> - Obstacle detection (opening)
<input type="checkbox"/> - DCU fault	<input type="checkbox"/> - Manual release mode

Selective re-open
command display

- Opening time : 2.6 s.	- Closing time : 3.2 s.
- Opening dampening time : 950 ms.	- Closing dampening time : 1050 ms.
- Opening motor average current : 1.15 A.	- Closing motor average current : 1.30 A.

F1
RETURN
UPTRACK

F8
HELP

Door isolation

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input type="checkbox"/> - Close command	<input type="checkbox"/> - Close local
<input type="checkbox"/> - Open command	<input type="checkbox"/> - Manual release
<input type="checkbox"/> - Re-open command	<input type="checkbox"/> - EED unlocked
<input type="checkbox"/> - Leaf Locked Switch	<input type="checkbox"/> - In leaf state
<input type="checkbox"/> - Leaf Closed Switch	<input type="checkbox"/> - In leaf obstacle detection
<input type="checkbox"/> - Other Leaf Locked Switch	<input type="checkbox"/> - Lamp failure
<input type="checkbox"/> - Local control	
<input type="checkbox"/> - Open local	

DOOR LEAF STATUS

<input type="checkbox"/> - Door leaf proven closed	<input type="checkbox"/> - Drive fault
<input type="checkbox"/> - Door leaf fully opened	<input type="checkbox"/> - Time out
<input type="checkbox"/> - Door leaf in re-opening	<input type="checkbox"/> - Obstacle detection (closing)
<input checked="" type="checkbox"/> - Isolated door	<input type="checkbox"/> - Obstacle detection (opening)
<input type="checkbox"/> - DCU fault	<input type="checkbox"/> - Manual release mode

Isolation

command display

- Opening time : 2.6 s.	- Closing time : 3.2 s.
- Opening dampening time : 950 ms.	- Closing dampening time : 1050 ms.
- Opening motor average current : 1.15 A.	- Closing motor average current : 1.30 A.

F1
RETURN
UPTRACK

F8
HELP

• Case 1: Incoherent command inputs

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK		DOOR LEAF DCU INPUT STATUS	Date: 18/02/1997 Time: 09:53
① Incoherent command inputs	- Close command	<input type="checkbox"/>	- Close local
	- Open command	<input type="checkbox"/>	- Manual release
	- Re-open command	<input type="checkbox"/>	- EED unlocked
	- Leaf Locked Switch	<input type="checkbox"/>	■ - In leaf state ■ - In leaf obstacle detection ■ - Lamp failure
	- Leaf Closed Switch	<input type="checkbox"/>	
	- Other Leaf Locked Switch	<input type="checkbox"/>	
	- Local control	<input type="checkbox"/>	
	- Open local	<input type="checkbox"/>	
DOOR LEAF STATUS			
② DCU fault mode engaged	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
	- Door leaf fully opened	<input type="checkbox"/>	- Time out
	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
	- DCU fault	■	- Manual release mode
			③ PSD 05L recloses at low speed if needed
- Opening time : 2.6 s. - Closing time : 3.2 s. - Opening dampening time : 950 ms. - Closing dampening time : 1050 ms. - Opening motor average current : 1.15 A. - Closing motor average current : 1.30 A.			
F1 RETURN UPTRACK		F8 HELP	

• Case 2:Leaf Locked Switch (LLS) out of order

AEL2 : KOWLOON STATION

PSD 05L UPTAKE

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997

Time: 09:53

<input checked="" type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input type="checkbox"/>	- Leaf Locked Switch	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	- Leaf Closed Switch	<input checked="" type="checkbox"/>	- In leaf state
<input checked="" type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Local control	<input type="checkbox"/>	
<input type="checkbox"/>	- Open local	<input type="checkbox"/>	- Lamp failure

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input checked="" type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input checked="" type="checkbox"/>	- DCU fault	<input checked="" type="checkbox"/>	- Manual release mode

LLS failure during
Close command

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP



• Case 3: Leaf Closed Switch (LCS) failure

AEL2 : KOWLOON STATION

PSD 05L UPTAKE

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input checked="" type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input type="checkbox"/>	- Leaf Locked Switch	<input type="checkbox"/>	- In leaf state
<input checked="" type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input checked="" type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

LCS failure during

Open command

- Opening time : **2.6** s. - Closing time : **3.2** s.
- Opening dampening time : **950** ms. - Closing dampening time : **1050** ms.
- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP



• Case 4: Motor unit failure / DCU unable to drive the motor

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input checked="" type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input checked="" type="checkbox"/>	- Leaf Locked Switch	<input checked="" type="checkbox"/>	- In leaf state
<input checked="" type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input checked="" type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

Motor failure during
Open command

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP



• Case 5: Inconsistent switch sequence during closing

AEL2 : KOWLOON STATION

PSD 05L UPTTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

Inconsistent
switch status
sequence

<input checked="" type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input checked="" type="checkbox"/>	- Leaf Locked Switch	<input checked="" type="checkbox"/>	- In leaf state
<input checked="" type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- Lamp failure
<input type="checkbox"/>	- Local control		
<input type="checkbox"/>	- Open local		

DOOR LEAF STATUS

LCS/LLS sequence
fault during Closing

<input checked="" type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input checked="" type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

- Opening time : 2.6 s.	- Closing time : 3.2 s.
- Opening dampening time : 950 ms.	- Closing dampening time : 1050 ms.
- Opening motor average current : 1.15 A.	- Closing motor average current : 1.30 A.

F1
RETURN
UPTRACK

F8
HELP

- **Case 6: Manual intervention box fault**

AEL2 : KOWLOON STATION

PSD 05L UPTRACK

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997

Time: 09:53

	- Close command		- Close local
	- Open command		- Manual release
	- Re-open command		- EED unlocked
	- Leaf Locked Switch		- In leaf state
	- Leaf Closed Switch		- In leaf obstacle detection
	- Other Leaf Locked Switch		- Lamp failure
	- Local control		
	- Open local		

DOOR LEAF STATUS

	- Door leaf proven closed		- Drive fault
	- Door leaf fully opened		- Time out
	- Door leaf in re-opening		- Obstacle detection (closing)
	- Isolated door		- Obstacle detection (opening)
	- DCU fault		- Manual release mode

Manual intervention box fault during local commands

- Opening time : **2.6** s. - Closing time : **3.2** s.
- Opening dampening time : **950** ms. - Closing dampening time : **1050** ms.
- Opening motor average current : **1.15** A. - Closing motor average current : **1.30** A.

F1
RETURN
UPTRACK

F8
HELP



• Case 7: Abnormal door operation due to seizing or friction

AEL2 : KOWLOON STATION

PSD 05L UPTAKE

DOOR LEAF DCU INPUT STATUS

Date: 18/02/1997
Time: 09:53

<input type="checkbox"/>	- Close command	<input type="checkbox"/>	- Close local
<input checked="" type="checkbox"/>	- Open command	<input type="checkbox"/>	- Manual release
<input type="checkbox"/>	- Re-open command	<input type="checkbox"/>	- EED unlocked
<input type="checkbox"/>	- Leaf Locked Switch	<input type="checkbox"/>	
<input type="checkbox"/>	- Leaf Closed Switch	<input type="checkbox"/>	- In leaf state
<input type="checkbox"/>	- Other Leaf Locked Switch	<input type="checkbox"/>	- In leaf obstacle detection
<input type="checkbox"/>	- Local control	<input type="checkbox"/>	
<input type="checkbox"/>	- Open local	<input type="checkbox"/>	- Lamp failure

DOOR LEAF STATUS

<input type="checkbox"/>	- Door leaf proven closed	<input type="checkbox"/>	- Drive fault
<input checked="" type="checkbox"/>	- Door leaf fully opened	<input type="checkbox"/>	- Time out
<input type="checkbox"/>	- Door leaf in re-opening	<input type="checkbox"/>	- Obstacle detection (closing)
<input type="checkbox"/>	- Isolated door	<input type="checkbox"/>	- Obstacle detection (opening)
<input type="checkbox"/>	- DCU fault	<input type="checkbox"/>	- Manual release mode

Time and current
drift due to friction or
seizing at door level

- Opening time : **2.6** s.

- Closing time : **3.2** s.

- Opening dampening time : **950** ms.

- Closing dampening time : **1050** ms.

Additional
chafing
current

- Opening motor average current : **2.02** A.

- Closing motor average current : **2.30** A.

F1
RETURN
UPTRACK

F8
HELP

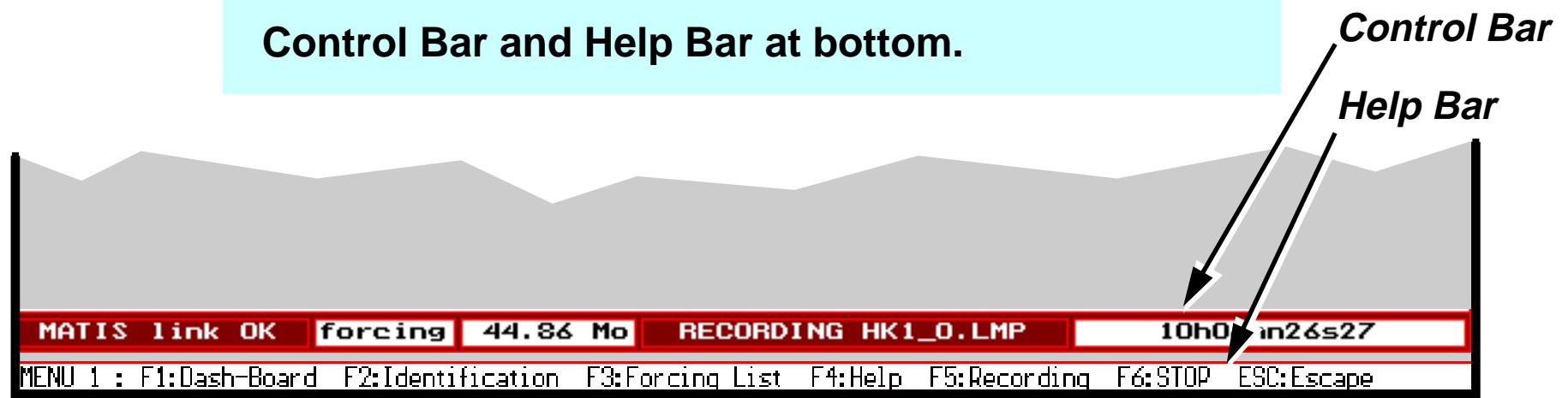


PAS software description

After having selected **PAS .EXE** , the following welcome screen appears:

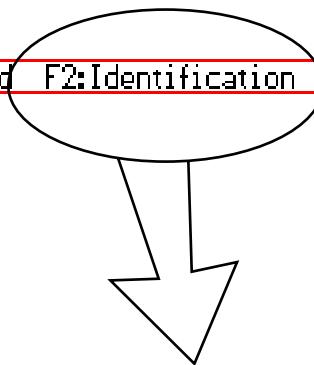


... then the standard PAS screen appears, with Control Bar and Help Bar at bottom.



1. Equipment identification

MENU 1 : F1:Dash-Board F2:Identification F3:Forcing List F4:Help F5:Recording F6:STOP ESC:Escape



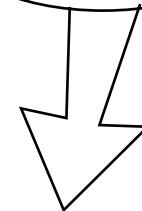
- EQUIPEMENT IDENTIFICATION -

Door type	(10 caract.): PSD
DCU coding	(3 caract.): 1
Date	(20 caract.): 28/02/97
DCU software issue	(4 caract.): 1.1
DCU issue	(2 caract.): C
Site name	(20 caract.): Hong-Kong
Operator name	(20 caract.): CMU

Are the above data correct ? (press key ENTER or N) :

2. Analogical Modifiable Parameters

MENU 1 : F1:Dash-Board F2:Identification F3:Forcing List F4:Help F5:Recording F6:STOP ESC:Escape

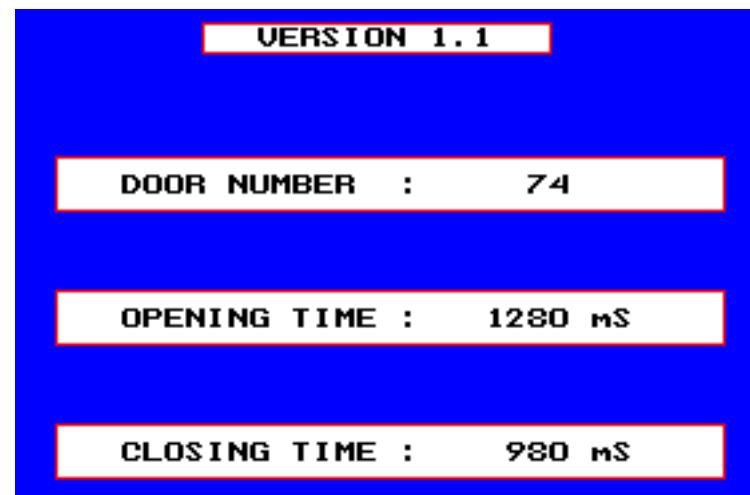
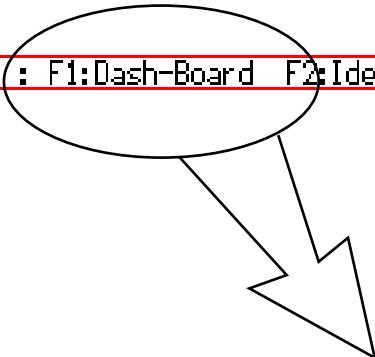


ANALOGICAL MODIFIABLE PARAMETERS

EFFORT TIME	50.0	ms
RELEASE TIME	2000.0	ms
NUMBER O.D	3.0	--
UNLOCK FORCE	120.0	--
DOOR FORCE	105.0	--
HIGH_SPEED_CL	135.0	--
HIGH_SPEED_OP	180.0	--
LOW_SPEED_CL	40.0	--
LOW_SPEED_OP	40.0	--
THRESHOLD_O21	900.0	ms
THRESHOLD_O22	800.0	mm
THRESHOLD_O23	900.0	mm
THRESHOLD_C21	600.0	ms
THRESHOLD_C22	190.0	mm
THRESHOLD_C23	140.0	mm
CHIME DELAY O	3000.0	ms
CHIME DELAY C	3000.0	ms

3. Functional Check

MENU 1 : F1:Dash-Board F2:Identification F3:Forcing List F4:Help F5:Recording F6:STOP ESC:Escape



Parameter adjustment : Obstacle detection

ANALOGICAL MODIFIABLE PARAMETERS

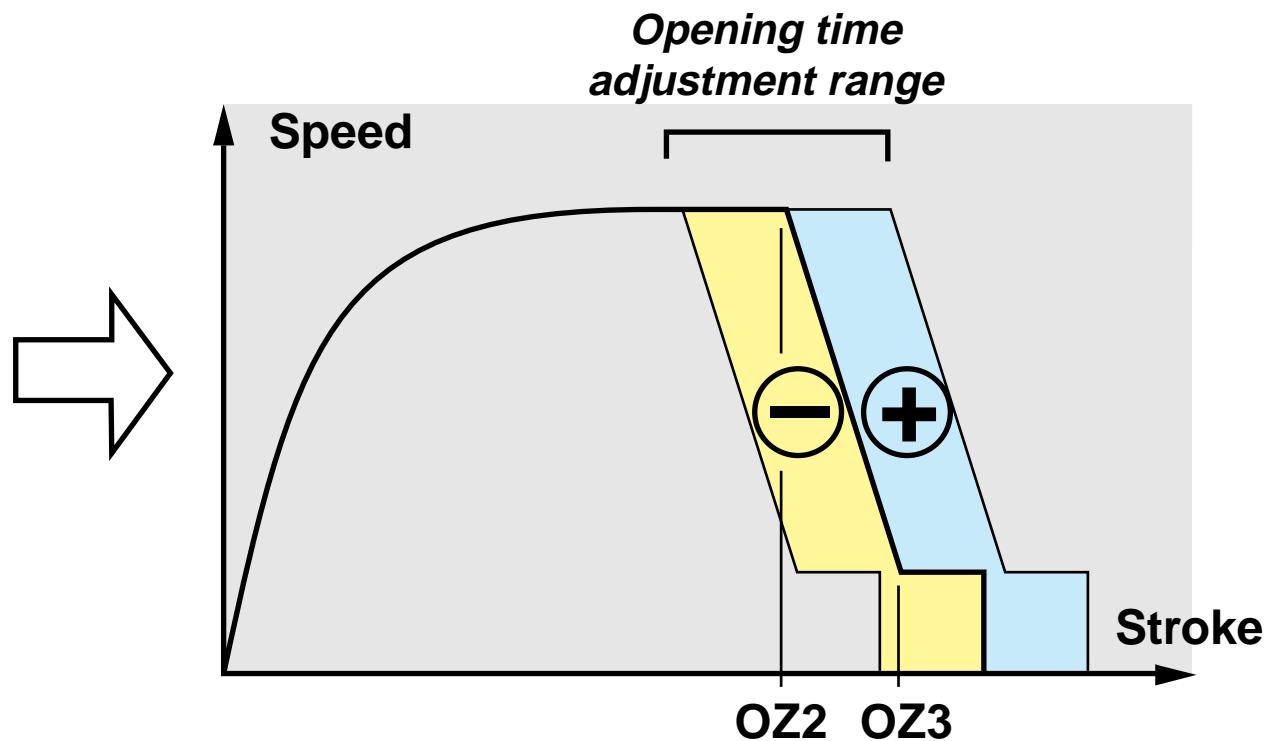
EFFORT TIME	300.0	ms
RELEASE TIME	2000.0	ms
NUMBER O.D	3.0	--
UNLOCK FORCE	120.0	--
DOOR FORCE	105.0	--
HIGH_SPEED_CL	135.0	--
HIGH_SPEED_OP	180.0	--
LOW_SPEED_CL	40.0	--
LOW_SPEED_OP	40.0	--
THRESHOLD_OZ1	900.0	ms
THRESHOLD_OZ2	800.0	mm
THRESHOLD_OZ3	900.0	mm
THRESHOLD_CZ1	600.0	ms
THRESHOLD_CZ2	190.0	mm
THRESHOLD_CZ3	140.0	mm
CHIME DELAY O	3000.0	ms
CHIME DELAY C	3000.0	ms

Parameter	Adjustment range	PSD setting values	PED setting values
Wait state duration on obstacle detection	0.3 to 2 s	0.3 s	0.3 s
Release time on obstacle detection	0.1 to 5 s	2 s	2 s
No of attempts on obstacle detection	1 to 20	3	3

Parameter adjustment : Automatic Opening Mode (1/2)

ANALOGICAL MODIFIABLE PARAMETERS

EFFORT TIME	300.0 ms
RELEASE TIME	2000.0 ms
NUMBER O.D	3.0 --
UNLOCK FORCE	120.0 --
DOOR FORCE	105.0 --
HIGH_SPEED_CL	135.0 --
HIGH_SPEED_OP	180.0 --
LOW_SPEED_CL	40.0 --
LOW_SPEED_OP	40.0 --
THRESHOLD_OZ1	900.0 ms
THRESHOLD_OZ2	800.0 mm
THRESHOLD_OZ3	900.0 mm
THRESHOLD_CZ1	600.0 ms
THRESHOLD_CZ2	190.0 mm
THRESHOLD_CZ3	140.0 mm
CHIME DELAY O	3000.0 ms
CHIME DELAY C	3000.0 ms



Acceptance criteria:

$OZ2 \geq \text{Max stroke} - 250 \text{ mm}$

$OZ3 \leq \text{Max stroke} - 50 \text{ mm}$

$OZ3 - OZ2 \geq 50 \text{ mm}$

Parameter adjustment : Automatic Opening Mode (2/2)

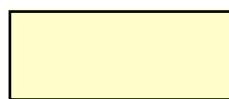
Parameter	Adjustment range	PSD setting values	PED setting values
Door overtorque force	115 to 170 N	170 N	170 N
Door opening high speed	0.27 to 0.67 m/s	0.6 m/s	0.6 m/s
Door opening dampening speed	0.07 to 0.20 m/s	0.13 m/s	0.13 m/s
Opening acceleration duration (OZ1)	600 to 1100 ms	900 ms	900 ms
Opening braking threshold (OZ2)	600 to 1100 mm	TCL: 800 mm AEL: 650 mm	1025 mm
Opening dampening threshold (OZ3)	650 to 1150 mm	TCL: 900 mm AEL: 700 mm	1075 mm
Chime duration on opening	0.2 to 10 s	3 s	3 s



Preferable adjustment mode



Influence on mechanical strains



Modification of kinetic energy values

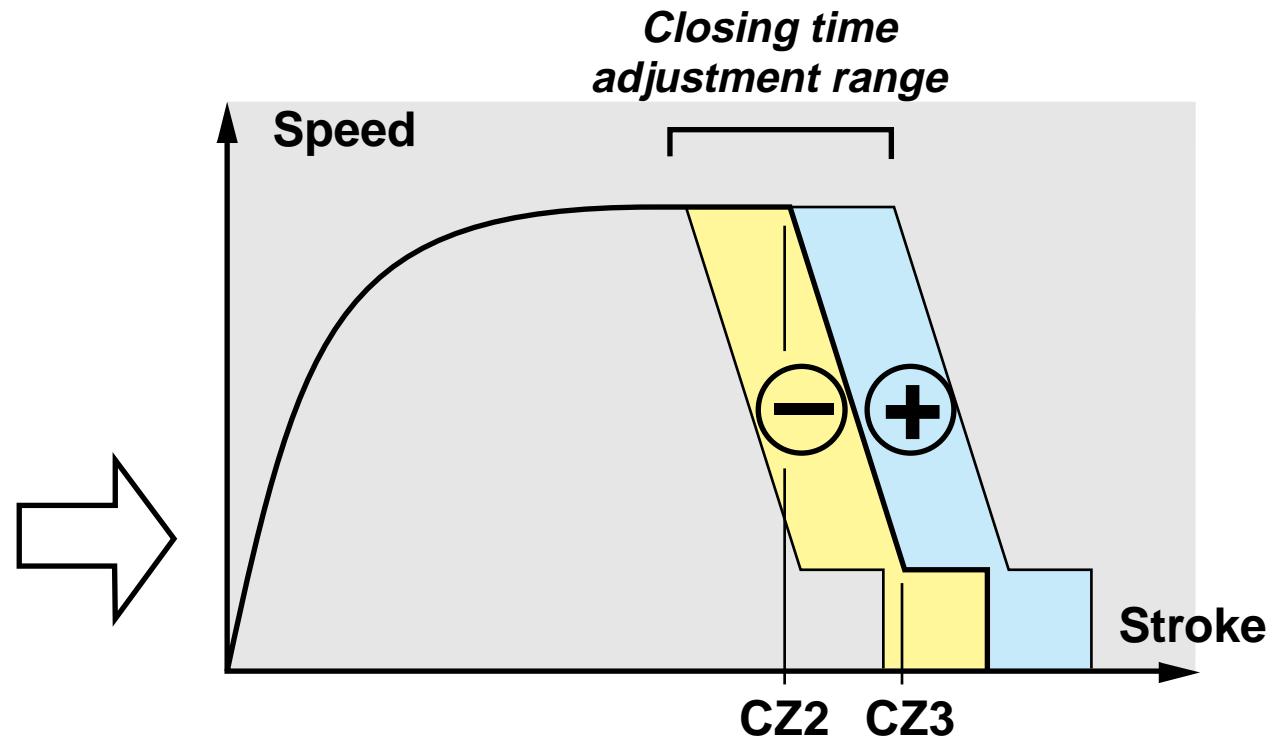


Not applicable

Parameter adjustment : Automatic Closing Mode (1/2)

ANALOGICAL MODIFIABLE PARAMETERS

EFFORT TIME	300.0 ms
RELEASE TIME	2000.0 ms
NUMBER O.D	3.0 --
UNLOCK FORCE	120.0 --
DOOR FORCE	105.0 --
HIGH_SPEED_CL	135.0 --
HIGH_SPEED_OP	180.0 --
LOW_SPEED_CL	40.0 --
LOW_SPEED_OP	40.0 --
THRESHOLD_OZ1	900.0 ms
THRESHOLD_OZ2	800.0 mm
THRESHOLD_OZ3	900.0 mm
THRESHOLD_CZ1	600.0 ms
THRESHOLD_CZ2	190.0 mm
THRESHOLD_CZ3	140.0 mm
CHIME DELAY O	3000.0 ms
CHIME DELAY C	3000.0 ms



Acceptance criteria:

$$CZ2 \leq 250\text{mm}$$

$$CZ3 \geq 50\text{mm}$$

$$CZ2 - CZ3 \geq 50\text{mm}$$

Parameter adjustment : Automatic Closing Mode (2/2)

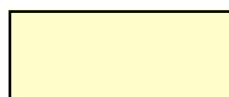
Parameter	Adjustment range	PSD setting values	PED setting values
Door closing force	115 to 170 N	150 N	150 N
Door closing high speed	0.27 to 0.6 m/s	0.45 m/s	0.55 m/s
Door closing dampening speed	0.07 to 0.20 m/s	0.13 m/s	0.13 m/s
Closing acceleration duration (CZ1)	600 to 1100 ms	TCL: 600 ms AEL: 800 ms	900 ms
→ Closing braking threshold (CZ2)	100 to 250 mm	TCL: 190 mm AEL: 200 mm	200 mm
→ Closing dampening threshold (CZ3)	50 to 200 mm	TCL: 140 mm AEL: 150 mm	150 mm
Chime duration on Closing	0.2 to 10 s	3 s	3 s



Preferable
adjustment mode



Influence on
mechanical strains

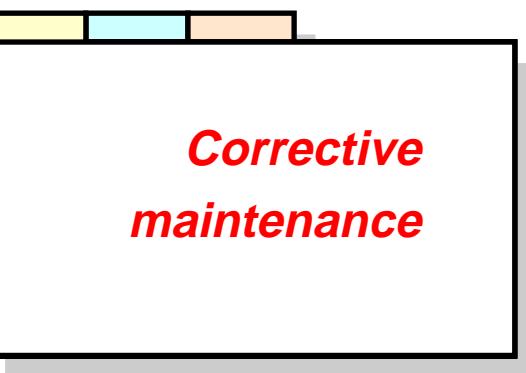


Modification of kinetic
energy values

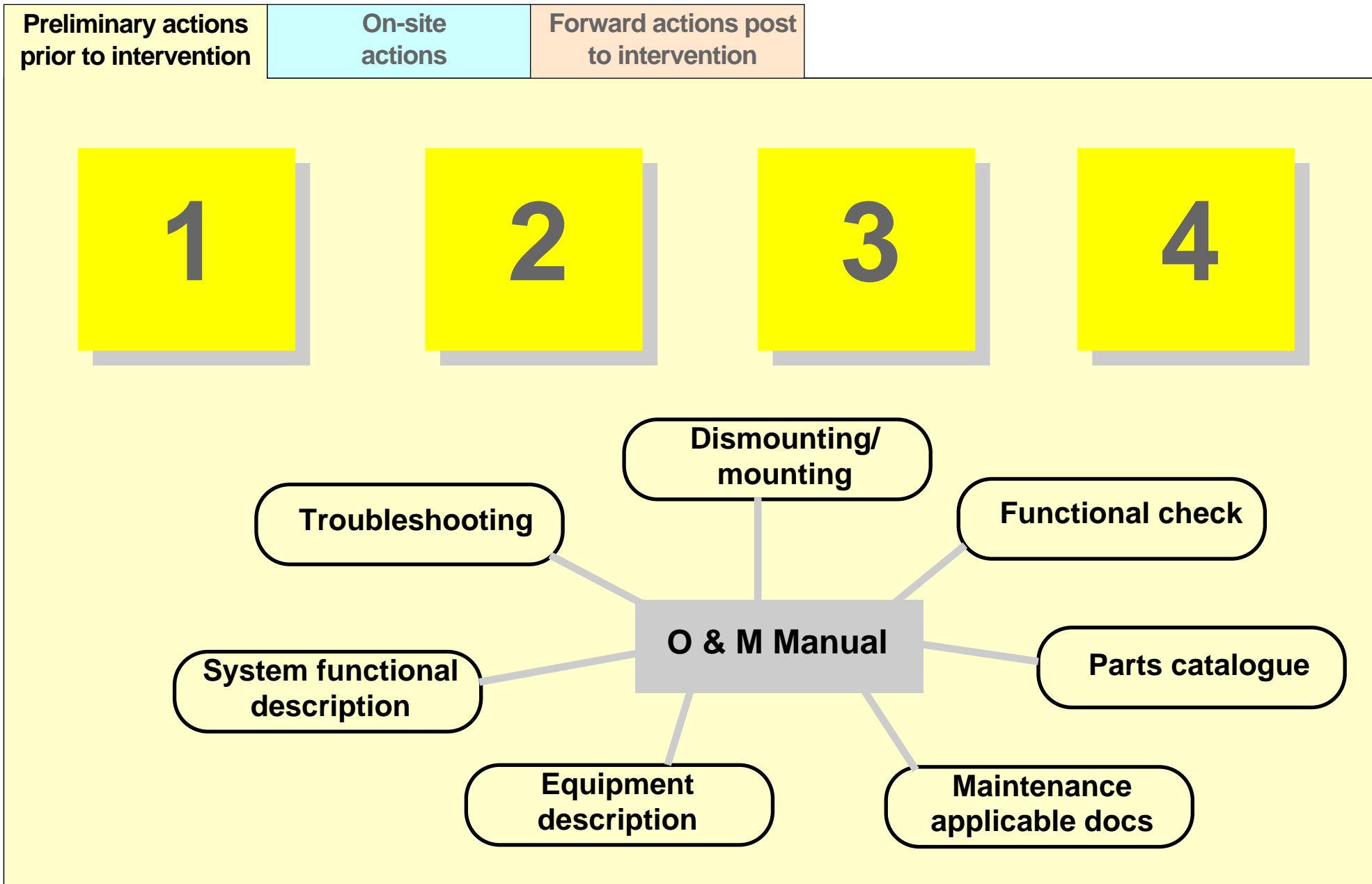


Not applicable

A. Maintenance philosophy

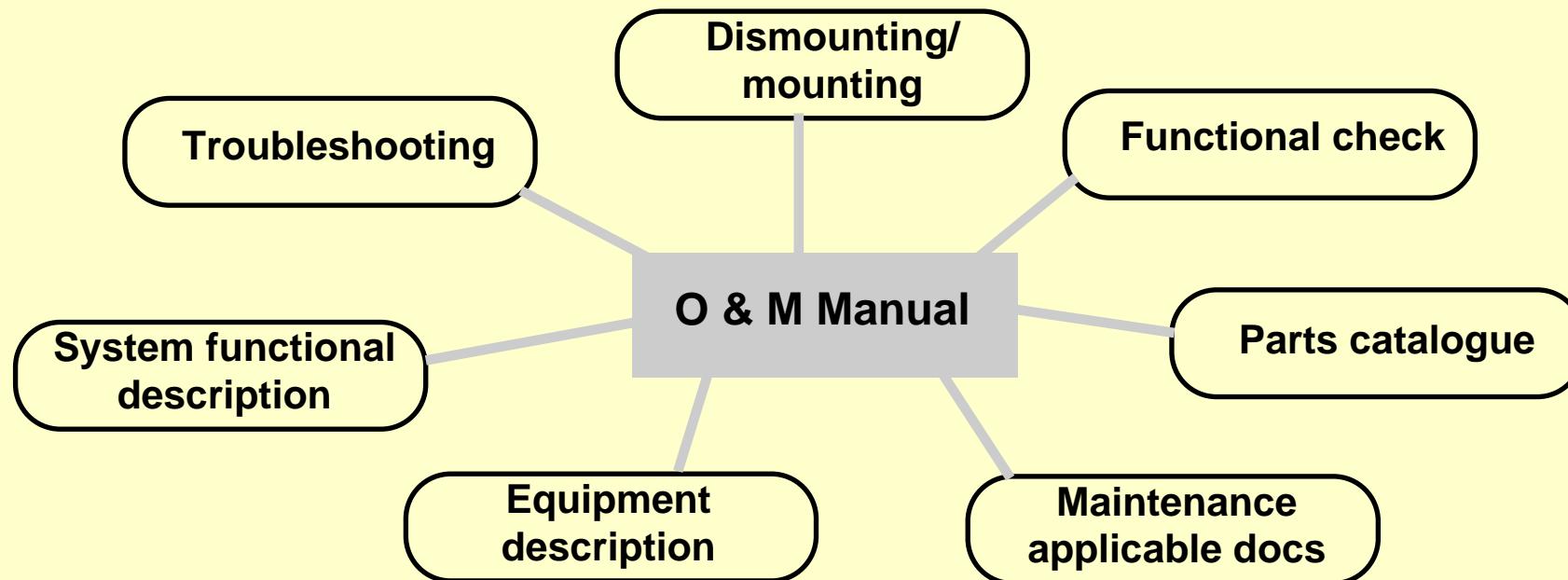


Corrective maintenance



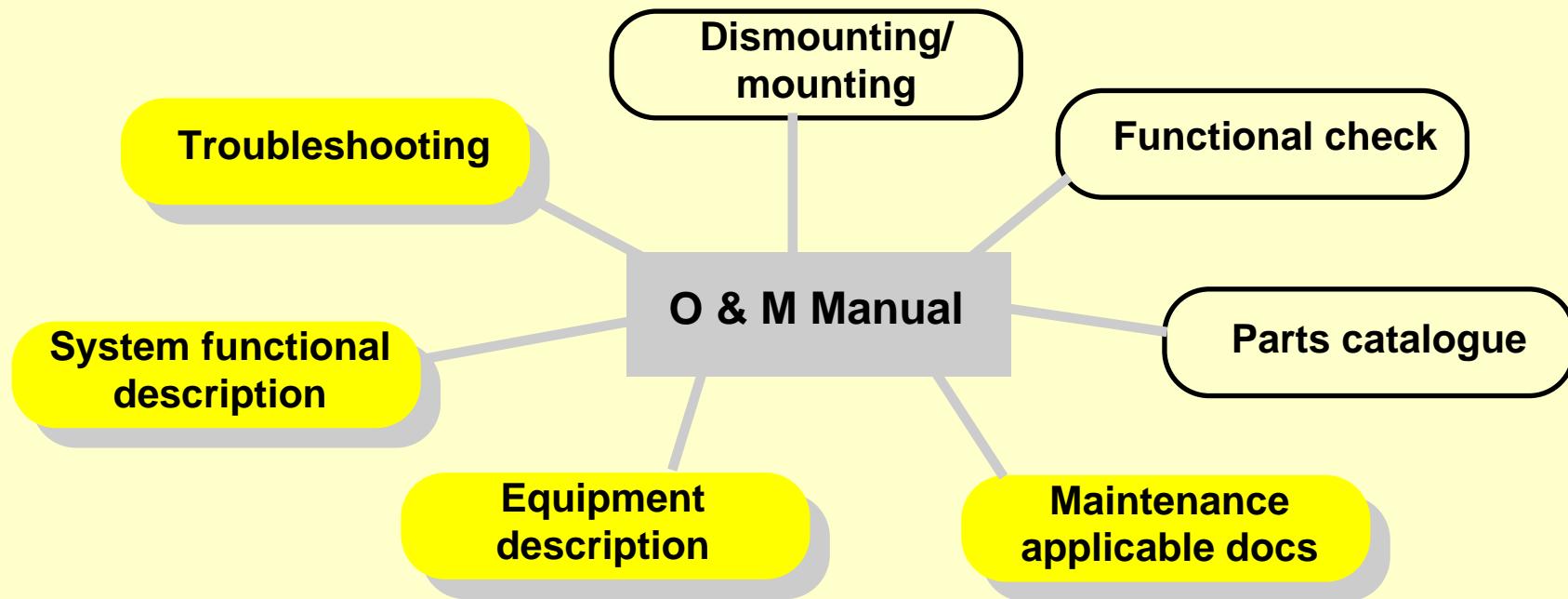
1

On reception of a phone call, the maintenance personnel on duty must fill up a service form featuring what sort of breakdown / abnormal situation has been spotted, if any alarm or fault messages were initiated, what action the line operators have taken against it.



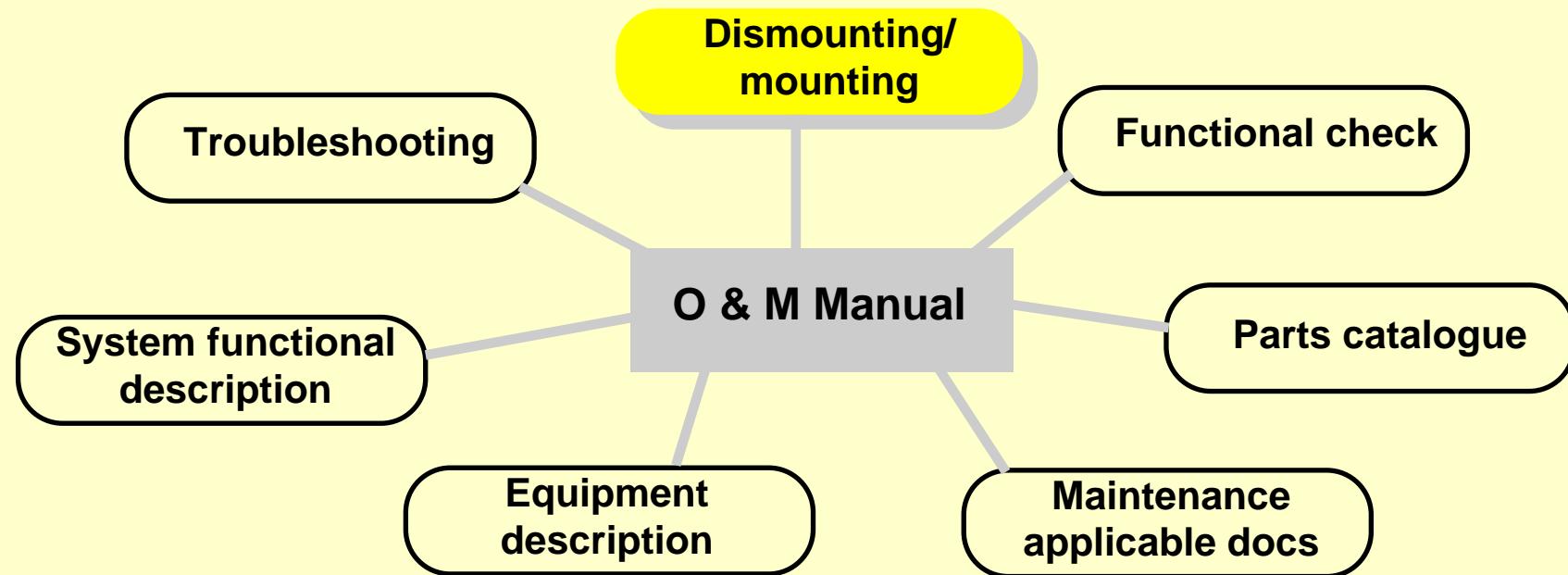
2

Draw a short list of the LRUs which are suspected of being out of order,
and get down the diagnosis aids to bring on site



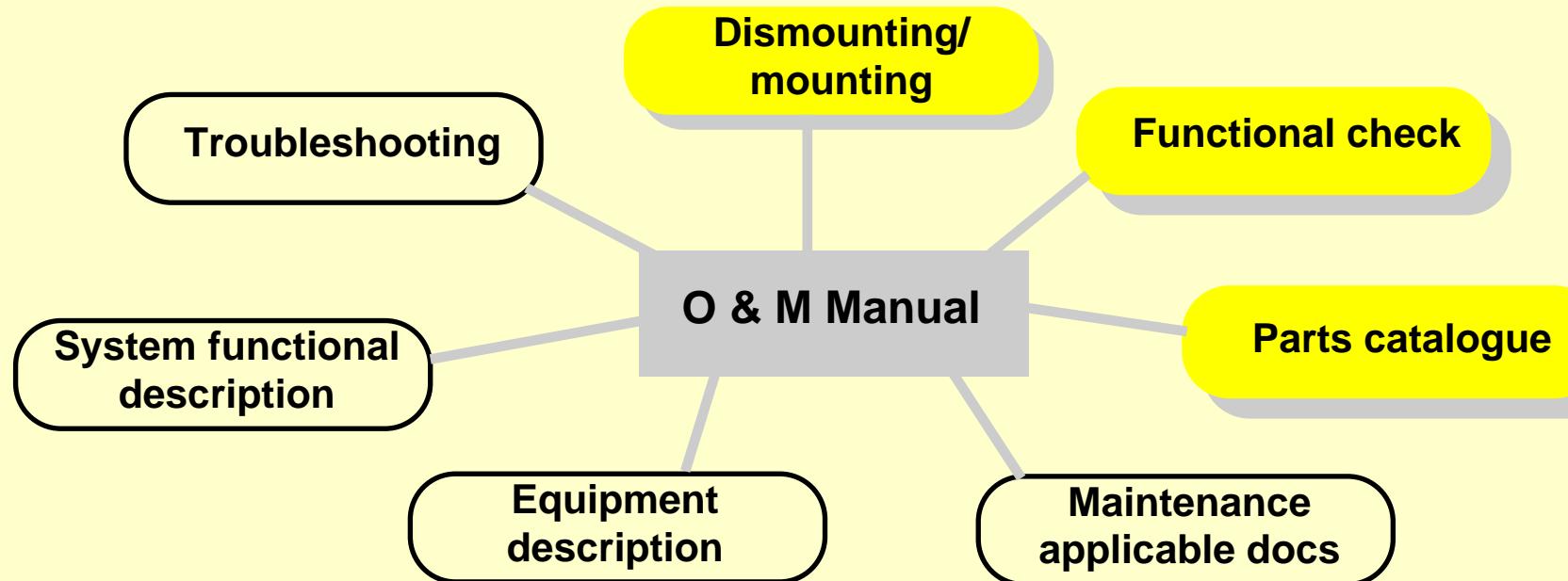
3

Collect the materials and aids required for LRU replacement

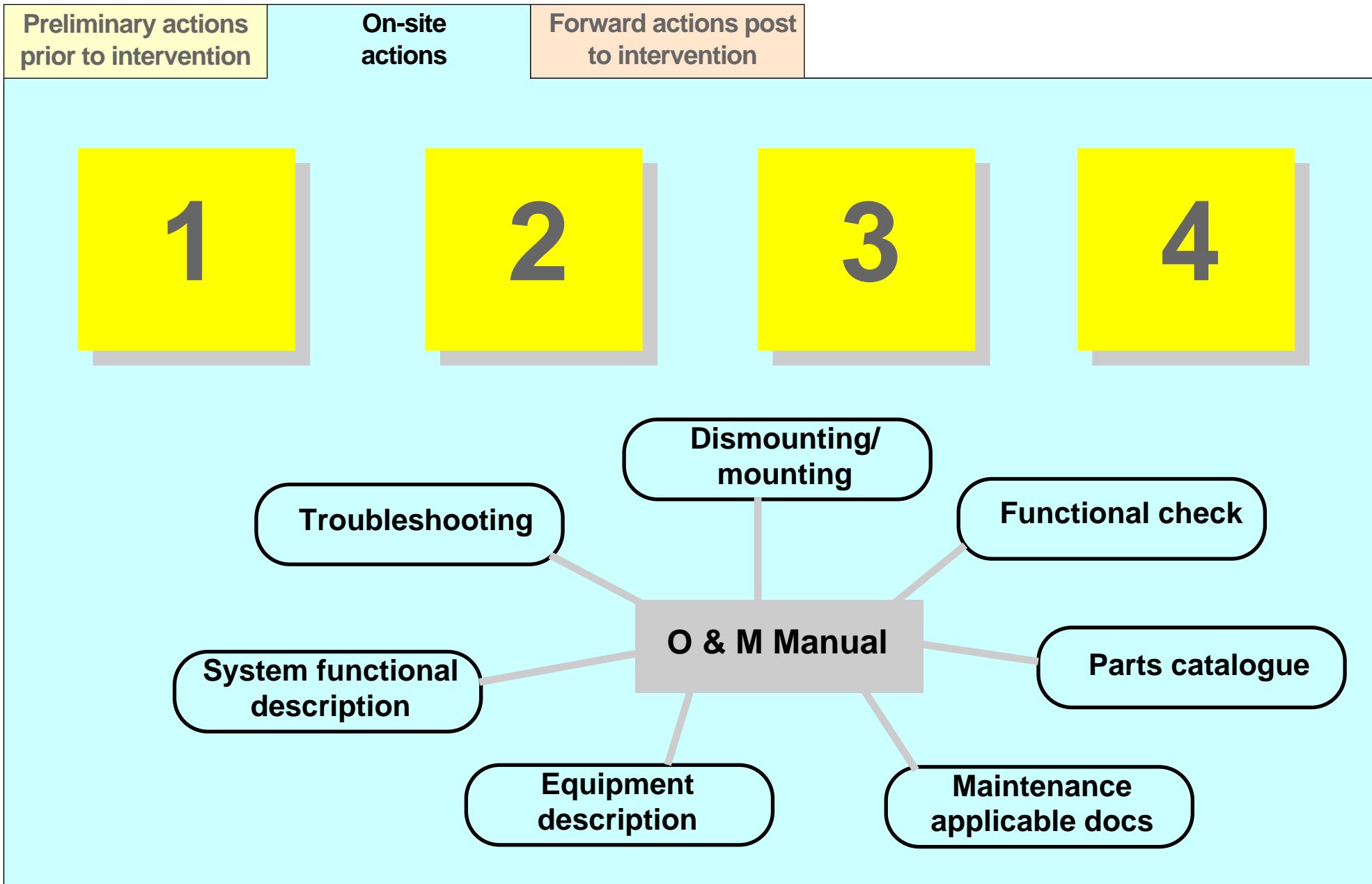


4

- Collect the tools required to carry out functional checks.
- Fetch the spare parts from the store room.

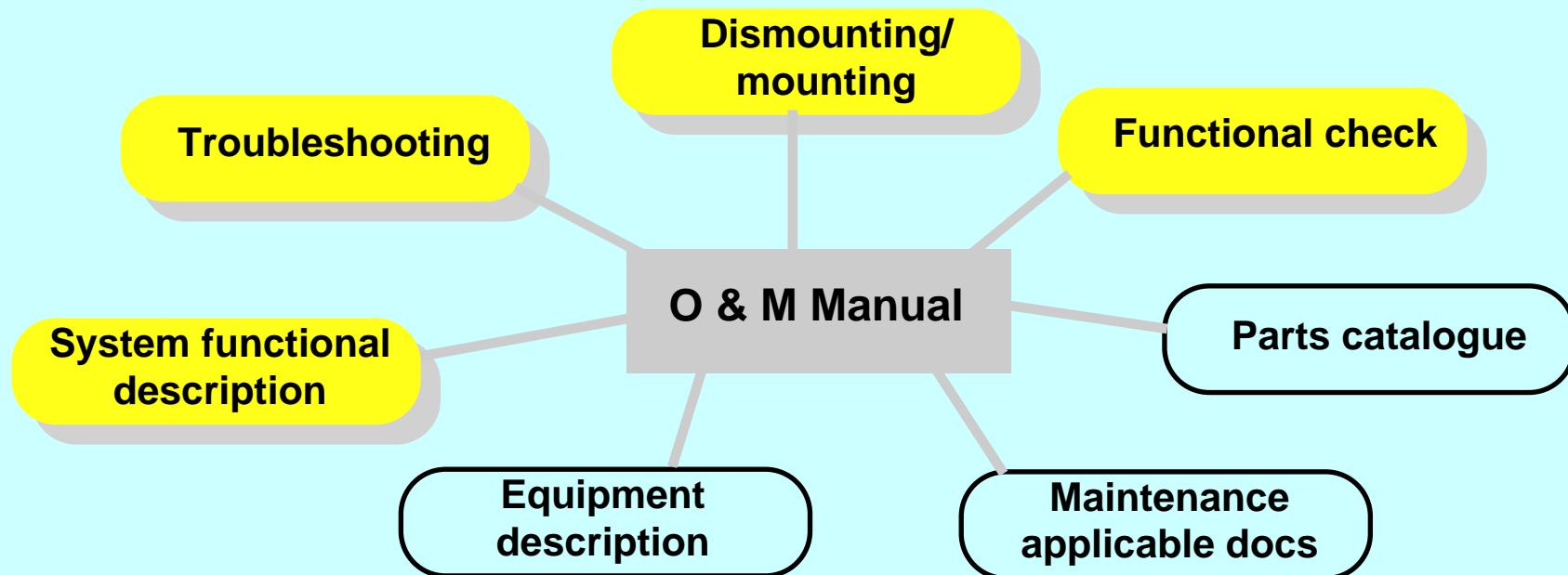


Corrective maintenance



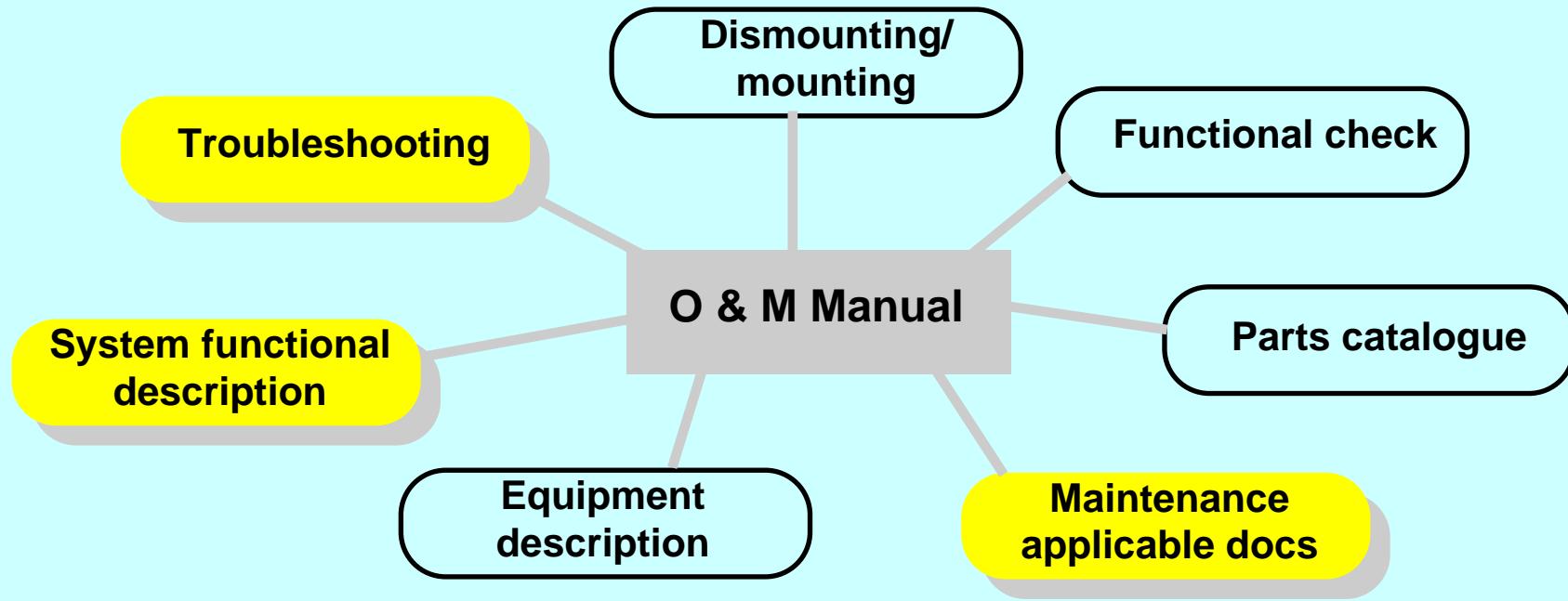
1

Give notice to OCC and station controller of the temporary disruption
created by the intervention



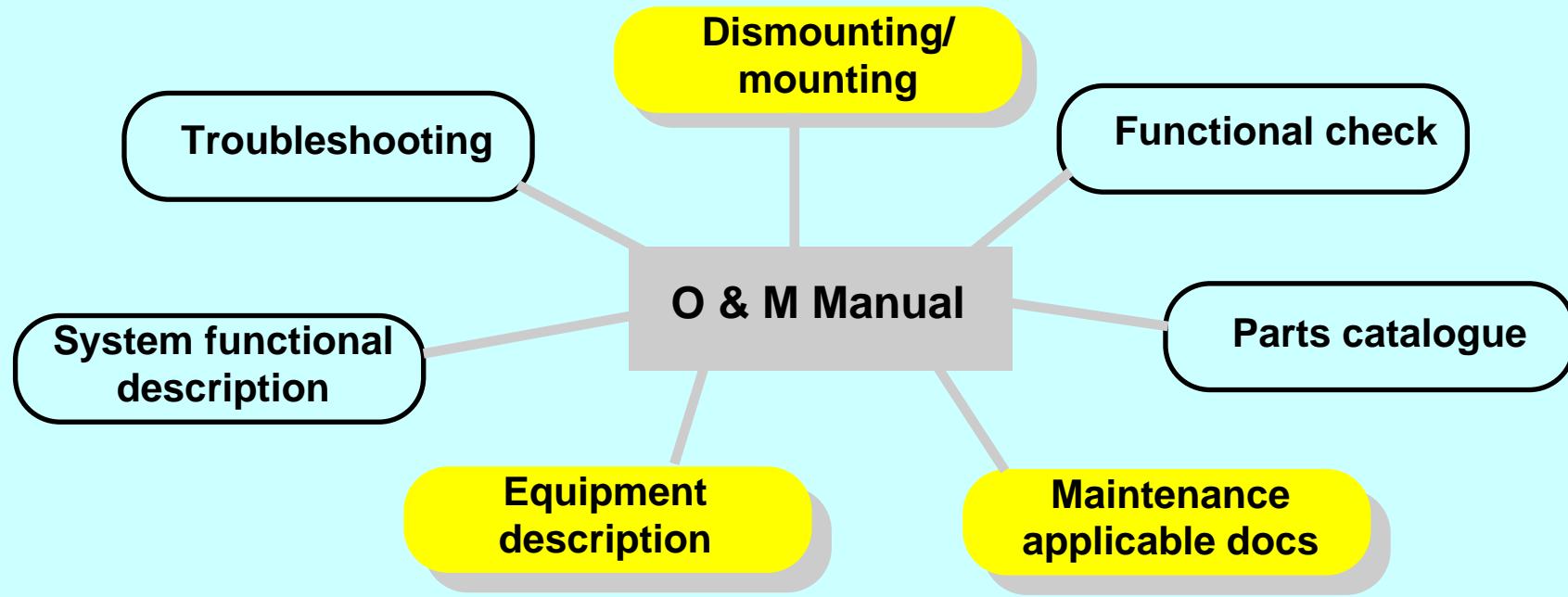
2

- Locate the faulty LRU; if needed, make use of the PSCD computer.
- Inhibit system for safety



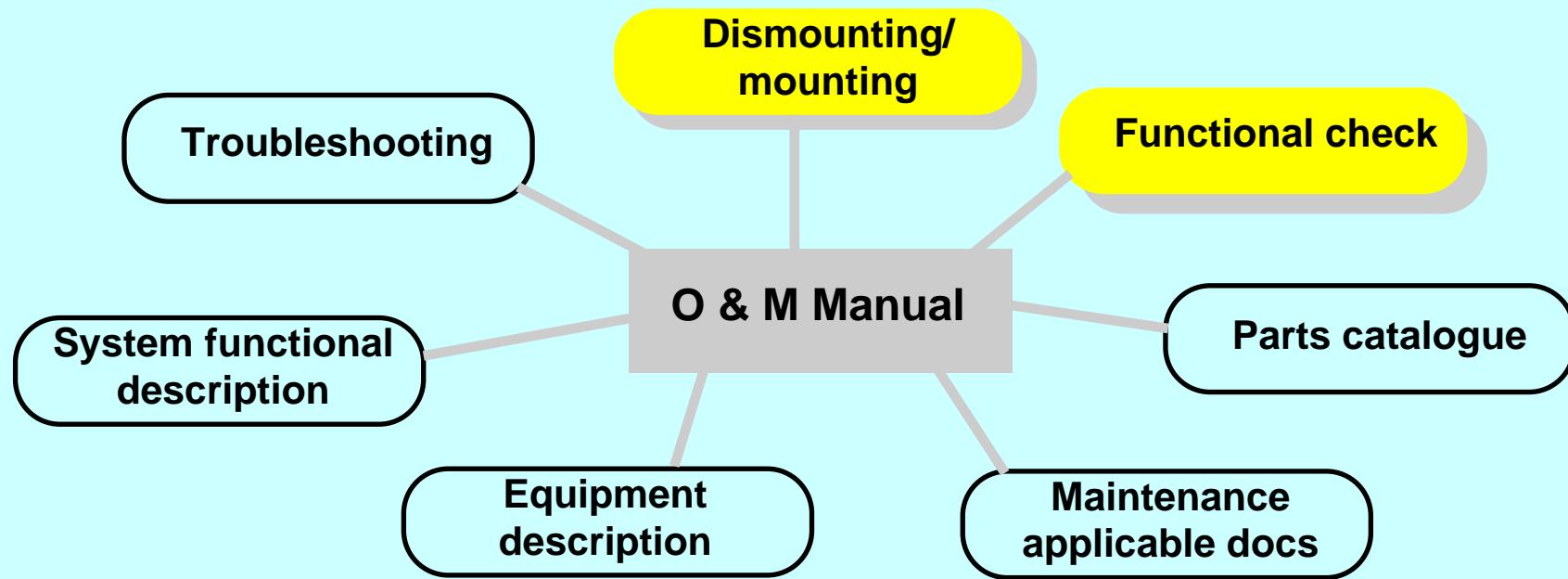
3

- Proceed to LRU replacement if needed; otherwise reset/re-install correctly the component/sub-assembly
- Consult the tightening torque table if the LRU has been dismounted.

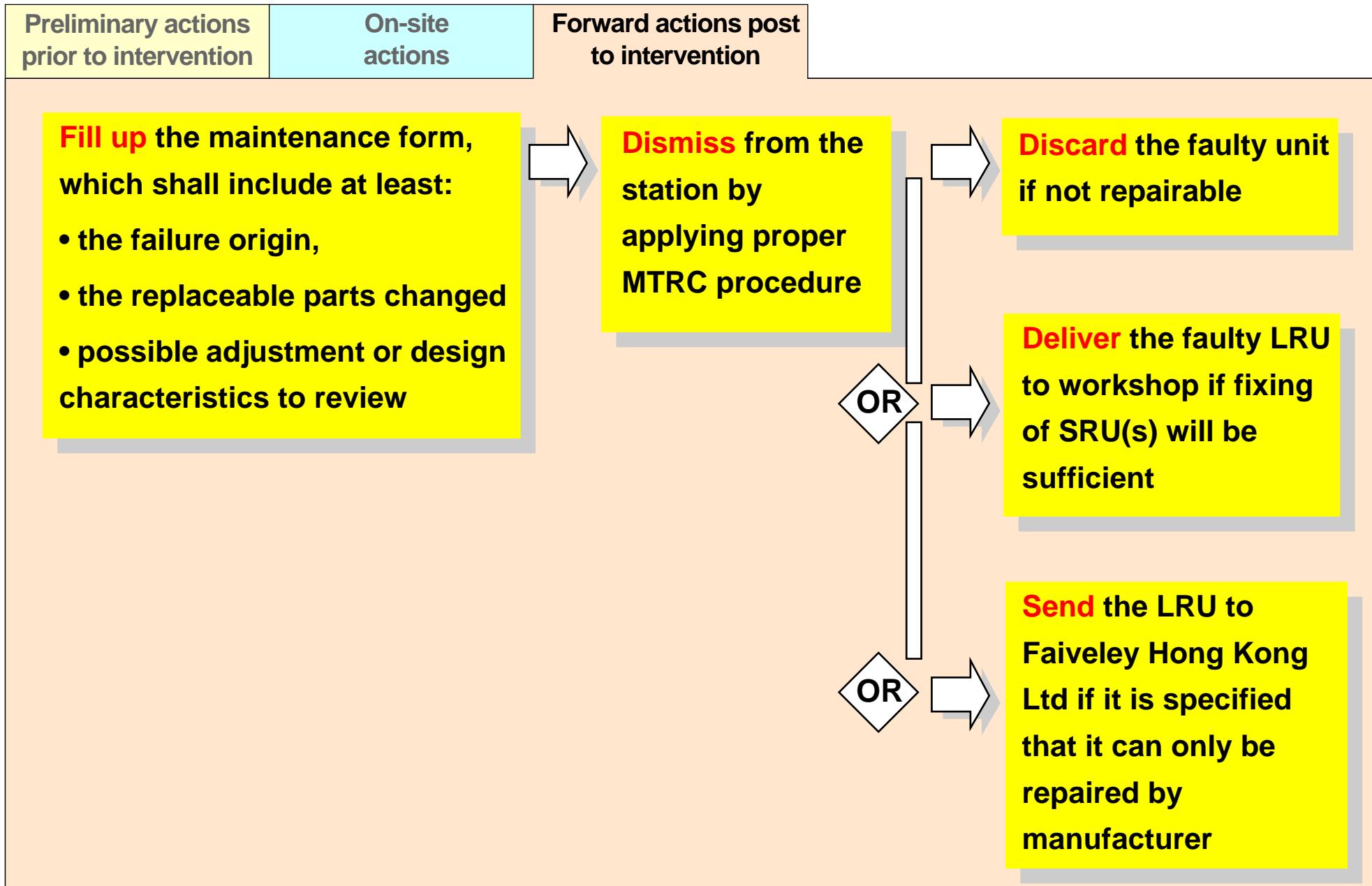


4

- Proceed to LRU adjustment & check.
- Recover system operation.



Corrective maintenance



Preventive maintenance

Schedule maintenance must be programmed by maintenance staff in accordance with the periodicity table included in the Preventive maintenance section of the O&M manual Volume 2.

Corresponding work instruction sheets will enable the maintenance crew to select aids and materials prior to intervention.

Equipment/ Activity	Preventive Maintenance Instruction Title	Ref.No.	Para. No.	Periods (*)				
				1 day	6 mon	2 yea	5 yea	10 yea
PSDs and PEDs								
Visual Checks	Platform screens visual Check	PM - 1	2.1.3	X				
Functional Checks	PSD & PED Functional Check	PM - 2	2.1.3		X			
Cleaning	PSD/PED special cleaning	PM - 3	2.1.3			X		
	DCU Cleaning	PM - 4	2.1.3					

Frequently PM, ST, TS, FC and DM type instructions are cross-referenced.

As a result, it is essential to go through the **entirety of the procedures** when listing the necessary tools + consumables to be used.

(*) May be subject to modifications



2. Line Maintenance

2.1 Preventive maintenance



GENERAL WARNING

This chapter contains all instructions to carry out the necessary preventive maintenance actions relating to the Platform Screen Door System. It is intended to be used by repair personnel competent in electrics and mechanics matters.

These instructions, as well as their periodicity, may be adapted by the operator; however, they are issued from both experience and safety and reliability analyses, and in order to ensure maximum safety and availability of the PSD System, they should be carefully followed; each procedure should especially be entirely applied, and not partially.

2.1.1 Maintenance Frequency

The preventive Maintenance activities shall be scheduled as defined in the following Maintenance Table:

Equipment/Activity	Preventive Maintenance Instruction			Periods					
	Title	Ref. No.	Para. No.	1(*) day	6 mon	2 yea	5 yea	10 yea	15 yea
PSDs and PEDs									
Visual Checks	Platform screens visual Check	PM - 1	2.1.3	X					
Functional Checks	PSD & PED Functional Check	PM - 2	2.1.3		X				
Cleaning	PSD/PED special cleaning	PM - 3	2.1.3			X			
	DCU Cleaning	PM - 4	2.1.3				X		
Greasing	Greasing of Driving Screw Assembly	PM - 5	2.1.3			X			
Inspection	Inspection of PSD & PED Door Operators,	PM - 6	2.1.3					X	
	Inspection and adjustment of door Leaves	PM - 7	2.1.3				X		
	Electrical insulation test of PSD & PEDs	PM - 8	2.1.3				X		
Exchange of parts	Central Plastic Ring	DM - 2 & DM - 40	2.3					X (TCL) (AEL)	X (AEL)
	Spherical Ball Bearing	WM - 2	3.3					X (TCL) (AEL)	X (AEL)
	Locking Roller with its Elastic Ring	DM - 3 & DM - 41	2.3					X (TCL) (AEL)	X (AEL)
	Locking Roller Endstop	DM - 4 & DM - 42	2.3					X (TCL) (AEL)	X (AEL)
	Endstop	DM - 16 & DM - 54	2.3					X (TCL) (AEL)	X (AEL)



Equipment/Activity	Preventive Maintenance Instruction	Title	Ref. No.	Para. No.	Periods				
					1(*) day	6 mon	2 yea	5 yea	10 yea
	Low Friction Pad		DM - 26 & DM - 66		2.3				X
	Plastic Pad Support		DM - 28 & DM - 69		2.3				X
	Front Seals		DM - 30 & DM - 68		2.3				X
	Brushes		DM - 23 & DM - 63		2.3				X
MSDs and EEDs									
Functional Check	MSD/EED Manual Release Functional check		FC - 5		2.4		X		
EPS									
Inspection	First level inspection of EPS battery charger unit		PM - 9		2.1.3	X			
	Second level inspection of EPS charger unit		PM - 10		2.1.3		X		
Cleaning	EPS/UPS cleaning		PM - 11		2.1.3		X		
Functional Check	EPS battery Unit functional check		FC - 7		2.4		X		
	EPS multithreshold relay functional check		FC - 9		2.4			X	
UPS									
Inspection	First level inspection of UPS regulated power supply unit		PM - 12		2.1.3	X			
PSC									
Functional Check	PSC, PSL & PEL functional check + 24Vdc power supply batteries functional check		PM - 13		2.1.3		X		
Exchange of parts	Safety Relays ⁽¹⁾		DM - 77		2.3			X (TCL) (AEL)	X (AEL)
	Auxiliary Relay (AEL only)		DM - 78		2.3				X
	Batteries on +24Vdc power supply		DM - 84		2.3		X		
PEL									
Exchange of parts	Auxiliary relay		DM - 78		2.3				X
	Illuminated push button - operating head		DM - 82		2.3		X		

1. Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

Routine visits

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



2. Line Maintenance

2.1 Preventive maintenance



GENERAL WARNING

This chapter contains all instructions to carry out the necessary preventive maintenance actions relating to the Platform Screen Door System. It is intended to be used by repair personnel competent in electrics and

These instructions issued from the safety and av. especially be

2.1.1 Maintenance

The preventive Table:

Equipment/Activity
PSDs and PEDs
Visual Checks
Functional Checks
Cleaning
Greasing
Inspection
Exchange of parts

Routine inspections shall be carried out frequently by competent personnel (not necessarily maintenance staff) on platform and in technical rooms.

Schedule visits are programmed during traffic hours considering that they do not disturb the system operation in any way. Their aim is to control visually if the whole installation is in a good shape.

Report any degradation, damage or abnormal operation (beyond tolerance margins) to the maintenance department for repair.

rev. B - January 1998

4 - 60

2. Line Maintenance

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



Equipment/Activity	Preventive Maintenance Instruction	Periods						X	X
		Title	Ref. No.	Para. No.	1(*) day	6 mon	2 yea	5 yea	10 yea
	Low Friction Pad	DM - 26 & DM - 66	2.3						
	Plastic Pad Support	DM - 28 & DM - 69	2.3						

PEL	Supply	Periods					
		1(*) day	6 mon	2 yea	5 yea	10 yea	15 yea
Exchange of parts	Auxiliary relay	DM - 78	2.3				
	Illuminated push button - operating head	DM - 82	2.3				

1. Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

rev. B - January 1998

4 - 61

2. Line Maintenance



Equipment inspection - 1/2

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

F

2. Line Maintenance

2.1 Preventive maintenance

This chapter refers to the maintenance of the electrics and the control system.

These interventions are issued from safety and reliability, especially

2.1.1 Maintenance

The preventive maintenance table:

Equipment/Activity
PSDs and PED
Visual Checks
Functional Checks
Cleaning
Greasing
Inspection

Exchange of parts

Second level maintenance requires a greater depth and therefore leads to a longer intervention time. Such intervention can only be carried out for several hours.

Operation and Station Control can be carried out without temporary system disruption such as:

- **selection of MANUAL/ISOLATION mode**
- **power cut of overhead line, or**
- **shutdown of EPS/UPS power**

Locking Roller Endstop	DM - 4 & DM - 42	2.3				X (TCL) (AE)
Endstop	DM - 16 & DM - 54	2.3				X (TCL) (AE)

rev. B - January 1998

4 - 60

2. Line Maintenance



Equipment inspection - 2/2

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



2. Line Maintenance

2.1 Preventive maintenance



This chapter refers to the electrics and

These instructions are issued from safety and especially

2.1.1 Maintenance

The preventive Table:

Equipment/Activity
PSDs and PED
Visual Checks
Functional Checks
Cleaning
Greasing
Inspection

Exchange of parts

***On completion of the visit, the maintenance crew shall reset the whole plant to normal operation and report:
on platform***

- If any wear or fracture is evolving, any part is missing or getting loose.**
- If the PSD/PED facade electrical isolation value is below 0,5 MΩ and in such case if an earth fault has been detected.**

in technical rooms

- If any faulty connection, overheating or damage is detected on components inside each cabinet.**
- If any sulfate buildup or electrolyte leak is detected on each battery block**
- If any degradation of components has occurred with time to the maintenance department, for repair.**

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



Equipment/Activity	Preventive Maintenance Instruction	Periods								
		Title	Ref. No.	Para. No.	1 (*) day	6 mon	2 yea	5 yea	10 yea	15 yea
Low Friction Pad	DM - 26	2.3							X	

Locking Roller Endstop	DM - 4 & DM - 42	2.3				X (TCL)	X (AEL)		
Endstop	DM - 16 & DM - 54	2.3				X (TCL)	X (AEL)		

Illuminated push button - operating head	DM - 82	2.3							X
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1. Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.



Equipment upkeep - 1/2

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



2. Line Maintenance

2.1 Preventive maintenance



GENERAL WARNING

This chapter contains all instructions to carry out the necessary preventive maintenance actions relating to the electrics and the mechanics.

These instructions are issued from the safety and reliability point of view, especially

2.1.1 Maintenance

The preventive maintenance table:

Equipment/Activity
PSDs and PEI
Visual Checks
Functional Checks
Cleaning
Greasing
Inspection
Exchange of parts

This service is aimed to:

- **dust all electrical/electronic components at preventive level, to avoid electrical disruption,**
- **remove solid deposit in header box and threshold groove, which may possibly end up in door jamming,**
- **clean the rubber peripheral seals of the fixed and moveable leaves,**
- **grease the driving components of the door operator which may undergo dry friction if the lubrication is poor.**

>>

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



Equipment/Activity	Preventive Maintenance Instruction Title	Ref. No.	Para. No.	Periods				
				1(*) day	6 mon	2 yea	5 yea	10 yea
	Low Friction Pad	DM - 26 & DM - 66	2.3					X
	Plastic Pad Support	DM - 28 & DM - 69	2.3					X

rev. B - January 1998

4 - 60

2. Line Maintenance

rev. B - January 1998

4 - 61

2. Line Maintenance

Equipment upkeep - 2/2

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



2. Line Maintenance

2.1 Preventive maintenance

⚠ GENERAL WARNING

This chapter contains all instructions to carry out the necessary preventive maintenance actions relating to the electrics and

These instructions issued from safety and especially

2.1.1 Maintenance

The preventive maintenance Table:

Equipment/Activity
PSDs and PEDs
Visual Checks
Functional Checks
Cleaning
Greasing
Inspection
Exchange of parts

Equipment upkeep leads to partially or totally disable the system and consequently can only be programmed during non traffic hours.

Operation and Station Control Centers shall be kept posted of the temporary system disruption that intervention is about to create, such as:

- Selection of MANUAL/ISOLATED mode at header box, or
- Total shutdown of EPS/UPS power supplies.

On completion of the visit, the maintenance crew shall reset the whole plant to normal operation.

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



Equipment/Activity	Preventive Maintenance Instruction Title	Ref. No.	Para. No.	Periods				
				1(*) day	6 mon	2 yea	5 yea	10 yea
	Low Friction Pad	DM - 26 & DM - 66	2.3					X
	Plastic Pad Support	DM - 28 & DM - 69	2.3					X

Locking Roller Endstop	DM - 4 & DM - 42	2.3			X (TCL)	X (AEL)		
Endstop	DM - 16 & DM - 54	2.3			X (TCL)	X (AEL)		

	Illuminated push button - operating head	DM - 82	2.3				X	
--	--	---------	-----	--	--	--	---	--

- Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

rev. B - January 1998

4 - 60

2. Line Maintenance

rev. B - January 1998

4 - 61

2. Line Maintenance



Exchange of parts - 2/3

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

FP

Equipment/Activity	Preventive Maintenance Instruction			Periods					
	Title	Ref. No.	Para. No.	1(*) day	6 mon	2 yea	5 yea	10 yea	15 yea
Low Friction Pad	DM - 26 & DM - 66	2.3						X	
Plastic Pad Support	DM - 28 & DM - 69	2.3						X	

ndurance test reports have enabled
LRUs involved and associated
particular:

ctor and leaves must be replaced
15 years for AEL,

d in the PSC/PEL panels which are
st be replaced every 5 years for TCL/

Vdc power supply must be replaced
ith manufacturer's guaranteed life

>>

1. Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

rev. B - January 1998

4 - 61

2. Line Maintenance

Exchange of parts - 3/3

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



2. Line Maintenance

2.1 Preventive maintenance



GENERAL WARNING

This chapter contains all instructions to carry out the necessary preventive maintenance actions relating to the Platform Screen Doors system. It is the responsibility of the operator to ensure that the preventive maintenance is carried out in accordance with the instructions given in this chapter.

These instructions are issued from the manufacturer and are intended to ensure the safety and availability of the system, especially because

2.1.1 Maintenance

The preventive maintenance Table:

Equipment/Activity
PSDs and PEDs
Visual Checks
Functional Checks
Cleaning
Greasing
Inspection
Exchange of parts

Parts exchange on platform must be carried out in order to comply with the applicable safety regulations. Procedure to follow for corrective maintenance, parts exchange and preliminary notice.

Note:

All consumable parts exchange, including light bulbs is not treated in this chapter. The operator has the competence to decide whether a part exchange is corrective or preventive level.

Part	Part	DM - 4 & DM - 42	2.3				X (TCL)	X (AEL)
Locking Roller Endstop	Endstop	DM - 16 & DM - 54	2.3				X (TCL)	X (AEL)

rev. B - January 1998

4 - 60

2. Line Maintenance

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

Equipment/Activity	Preventive Maintenance Instruction			Periods					
	Title	Ref. No.	Para. No.	1(*) day	6 mon	2 yea	5 yea	10 yea	15 yea
Low Friction Pad	DM - 26 & DM - 66	2.3					X		
Plastic Pad Support	DM - 28 & DM - 69	2.3					X		

must be accomplished progressively
availability criteria of AEL/TCL line
new shall be in accordance with
icularly regarding safety and

age such as fluorescent tubes or
the O&M manual. It is of MTRC
er the replacement will be at a

	Illuminated push button - operating head	DM - 82	2.3			X		
--	--	---------	-----	--	--	---	--	--

1. Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

rev. B - January 1998

4 - 61

2. Line Maintenance



Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4



Equipment/Activity	Preventive Maintenance Instruction			Periods					
	Title	Ref. No.	Para. No.	1(*) day	6 mon	2 yea	5 yea	10 yea	15 yea
	Low Friction Pad	DM - 26 & DM - 66	2.3					X	
	Plastic Pad Support	DM - 28 & DM - 69	2.3					X	X

The functional check includes:

the profile,

the function,

the release from platform and tracksides,

the release from manual intervention box,

the status and MSD operation.

The opening and automatic reclosing of door,

the release stage when flat (chargers out of order),

the management of the multithreshold relay.

The emergency power supply,

the energy management at PSC,

the communication with the PSL and PEL.

>>

	Illuminated push button - operating head	DM - 82	2.3			X		
--	--	---------	-----	--	--	---	--	--

- Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

rev. B - January 1998

4 - 61

2. Line Maintenance

Periodical functional check - 3/3

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

2. Line Maintenance

2.1 Preventive maintenance

GENERAL WARNING

This chapter contains all instructions to carry out the necessary preventive maintenance actions relating to the Platform Screen Doors System. These instructions are issued from both safety and availability points of view, especially be er...

2.1.1 Maintenance Equipment

The preventive maintenance table:

Equipment/Activity								
PSDs and PEDs								
Visual Checks								
Functional Checks								
Cleaning								
Greasing								
Inspection								
Exchange of parts								
Locking Rings								
Locking Roller Endstop	DM - 4 & DM - 42	2.3				X (TCL) (AEL)	X (TCL) (AEL)	
Endstop	DM - 16 & DM - 54	2.3				X (TCL) (AEL)	X (TCL) (AEL)	

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

Equipment/Activity	Title	Ref. No.	Para. No.	Periods				
				1(*) day	6 mon	2 yea	5 yea	10 yea
Low Friction Pad	DM - 26 & DM - 66	2.3					X	
Plastic Pad Support	DM - 28	2.3					X	

Such interventions can only be carried out during non traffic hours and follow the same procedure than functional checks prescribed in case of corrective maintenance. However, all tests on platform must be accomplished progressively on several days, in order to comply with the availability criteria of AEL/TCL line operation.

Operation and Station Control Centers shall be kept posted of the temporary system disruption that intervention is about to create, such as:

- Selection of MANUAL/ISOLATED mode at header box, or
- Total shutdown of EPS power supply, or
- Batteries discharge downstream of each charger unit.

On completion of the test, the maintenance crew shall reset the whole plant to normal operation and report if any irregularity in the system operation was detected and adjusted.

1. Only relays activated at every normal operating sequence are concerned, that is:
on AEL & TCL PSCs: KA01 to 04, 12 to 15, 26, 29, 31 to 34, 42 to 45, 56, 59.
on AEL PSCs only: KA16, 18, 19, 25, 46, 48, 49, 55.

(*) Is not strictly a maintenance activity and shall be carried out by station personnel.

Workshop maintenance

Guidelines

1

2

3

4

Workshop Maintenance

O & M Manual

System functional description

Parts catalogue

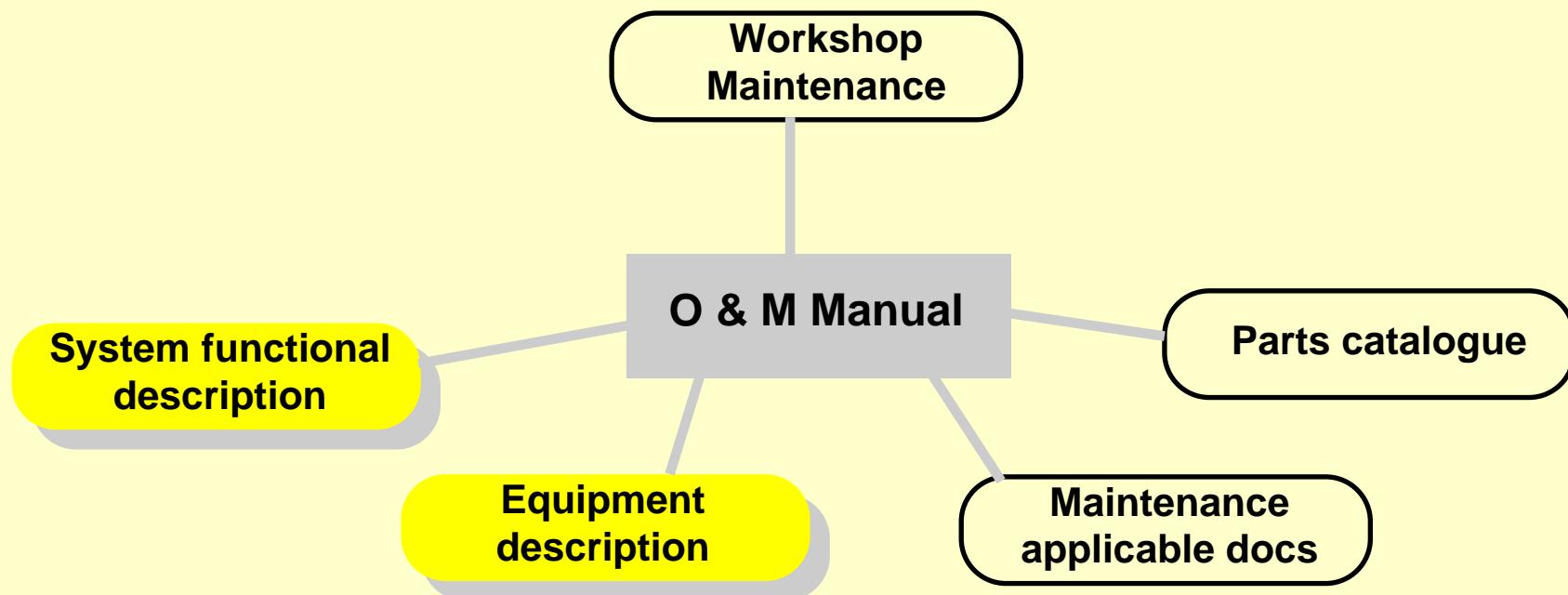
Equipment description

Maintenance applicable docs

Guidelines

1

On reception of the faulty LRU, the worker is informed of the circumstances of the failure, and diagnoses what repair must be done.

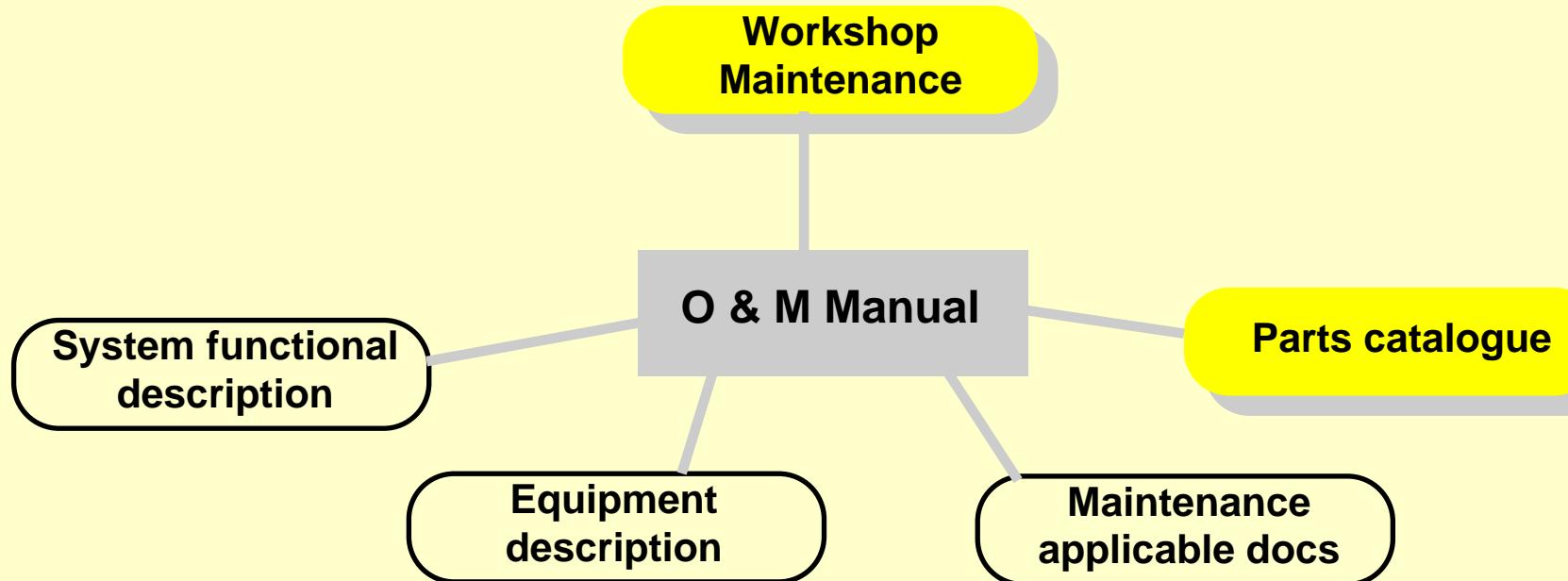


Guidelines

2

Collect:

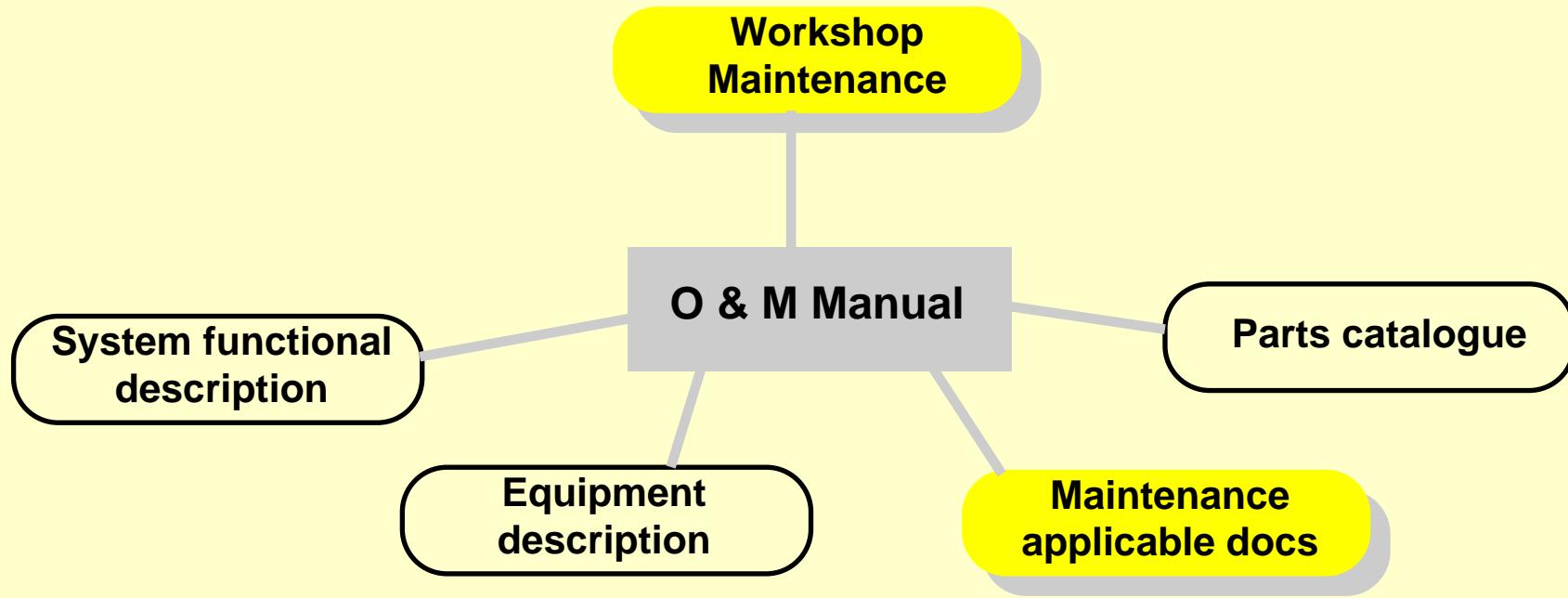
- **at workshop** all tools and equipment required,
- **at store room** necessary new parts



Guidelines

3

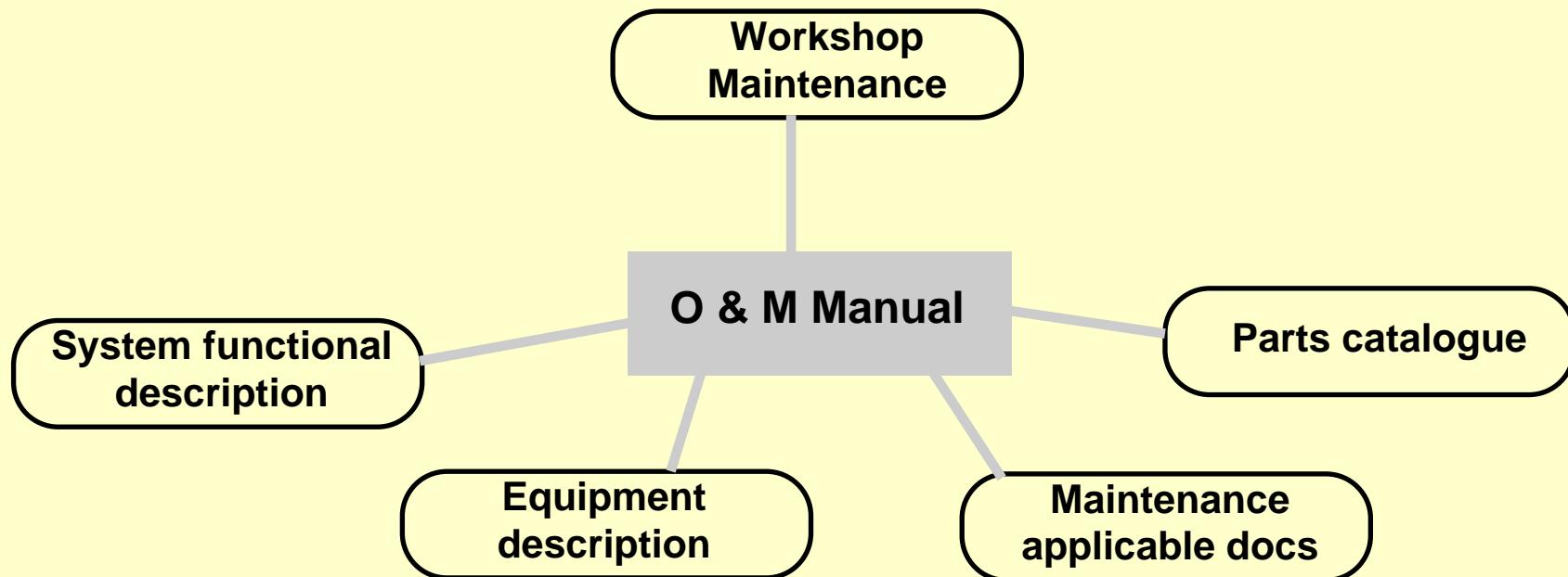
- Repair and adjust the LRU.
- Use the drive mechanism test bench if available.



Guidelines

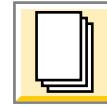
4

Fill up a maintenance form including:
failure origin, damages recorded, possible improvements to consider
which should enhance the reliability



B. Work instructions

*Preventive
maintenance*



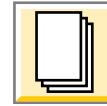
*Dismounting/
Mounting*



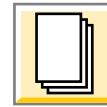
Troubleshooting



Functional check



*Workshop
maintenance*



Preventive maintenance

Work instruction identification

Title

Page

Statement of the equipment, location and goal the work instruction is applicable to

List of tools, measuring and test equipment required for the performance of the work

Step by step instructions supported by illustration (photographs/drawings) where appropriate.

Note : safety warning(s) are inserted in item 5 where appropriate. They are signalled by the  icon.

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION PM - 13 + 24Vdc power supply batteries functional check 1 of 1

1 Application
+ 24Vdc power supply unit is installed in the PSC and connected upstream of the MCSI. Its function is to maintain MCSI operational for at least 5 minutes, when UPS +24 Vdc input line is shutdown.

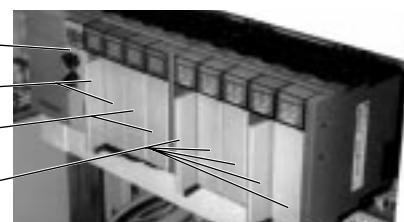
2 Operators
1 competent person knowledgeable in the MCSI

3 Aids
Tools:
- Locking key of the PSC cabinet
- Stopwatch

4 Materials
Not applicable

5 Procedure
1. Open the front door of the cabinet.
2. Open fuse terminal 1 at BN06 at the rear of the PSC and simultaneously set off the stopwatch.
3. Verify MCSI remains operational for at least 5 minutes, that is:
- RUN led lit up on SLC 5/04 CPU module, all other leds off,
- leds code sequence on Input and Output modules is displayed,
- ACT led lit up, PRT1 and PRT2 leds flashing fast on Communication modules.
If the test ever fails, then proceed to batteries exchange like detailed in Work instruction sheet DM - 84.
4. When the time is elapsed, switch the fuse terminal 1 at BN06 back on.

figure 4 - MCSI



rev. B - January 1998 4 - 96 2. Line Maintenance

Requirement of the proficiency and number of personnel, for the performance of the Work

List of the materials + associated quantities to be used for the performance of the work

Interactive zone of the computerized O&M manual, which permits to have access directly to designated dismounting/mounting work instruction

Note: also applicable for ST work instructions.

Troubleshooting (1/5)

Work instruction identification

Title

Page

Description of the scenarios
which for the work
instruction does apply

List of the tools and applicable
drawings/book(s) required to
test system equipment for the
performance of the work

MTRC document
reference

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION TS - 3 General command failure from Signalling System 1 of 7

1 Definition

Description: - train stops along the uptrack/downtrack platform at correct location,
- Train Operator presses DOOR OPEN push button on the correct platform side,
- car doors open while all PSDs remain closed.

or

- train stops along the uptrack/downtrack platform at correct location,
- Train Operator gives clearance for door closing,
- car doors close while all PSDs remain opened.

Location: Operator shall intervene where alarm source is supposed to be originated from (ER,CR or SER) or at the PSC if no alarm raised.

2 Aids

Required tools:

- at EPS/UPS:
 - AC/DC Multimeter
 - Oscilloscope (only for experts knowledgeable on full thyristors rectifier bridge technology for battery charger application)
- at PSC:
 - Multimeter
 - Set of test relays for troubleshooting

Applicable documents:

at UPS:	
- DC POWER SUPPLY	554/C/0000/FYT/901/670
at EPS:	
- BATTERY CHARGER UNIT:	
for 23 doors (AEL)	554/C/0000/FYT/901/640
for 40 doors (TCL)	554/C/0000/FYT/901/600
- DISTRIBUTION PANEL for AEL:	
1x23 doors	554/C/0000/FYT/901/660
2x23 doors	554/C/0000/FYT/901/650
- DISTRIBUTION PANEL for TCL:	
1x40 doors	554/C/0000/FYT/901/620

rev. B - January 1998 4 - 100 2. Line Maintenance

Troubleshooting (2/5)

Statement of:

- applicable safety regulations associated with the equipment or procedures.
- the actions required by maintenance personnel to ensure safety

Trouble shooting procedure is always represented in a flowchart for an easy comprehension

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION TS - 3 General command failure from Signalling System 2 of 7

2x40 doors 554/C/0000/FYT/901/610
at PSC:
AEL - 2 platforms 554/C/0000/FYT/901/260
TCL - 2 platforms 554/C/0000/FYT/901/330
TCL - 1 platform 554/C/0000/FYT/901/400

3 Safety precaution

at EPS/UPS: Apply MTRC safety regulations on electrical apparatus gauged for medium AC and low DC voltage.

at PSC: Inhibit opening command at PSC by disconnecting wires 1 to 3 at BN04¹ terminal board towards DCUs.
Apply MTRC safety regulations on electrical apparatus gauged for low DC voltage.

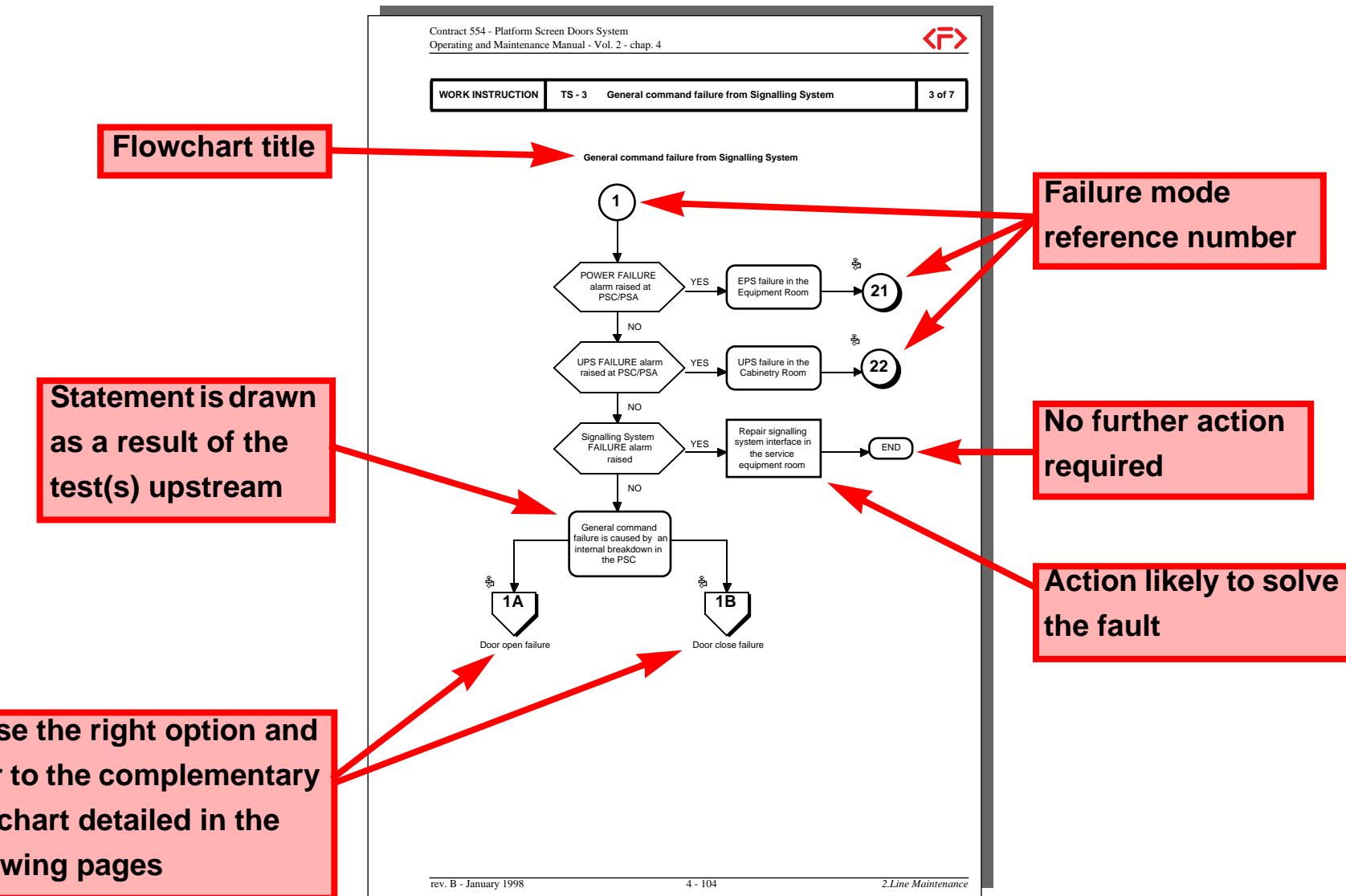
4 Procedure

See charts on following pages

(1) BN34 on downtrack

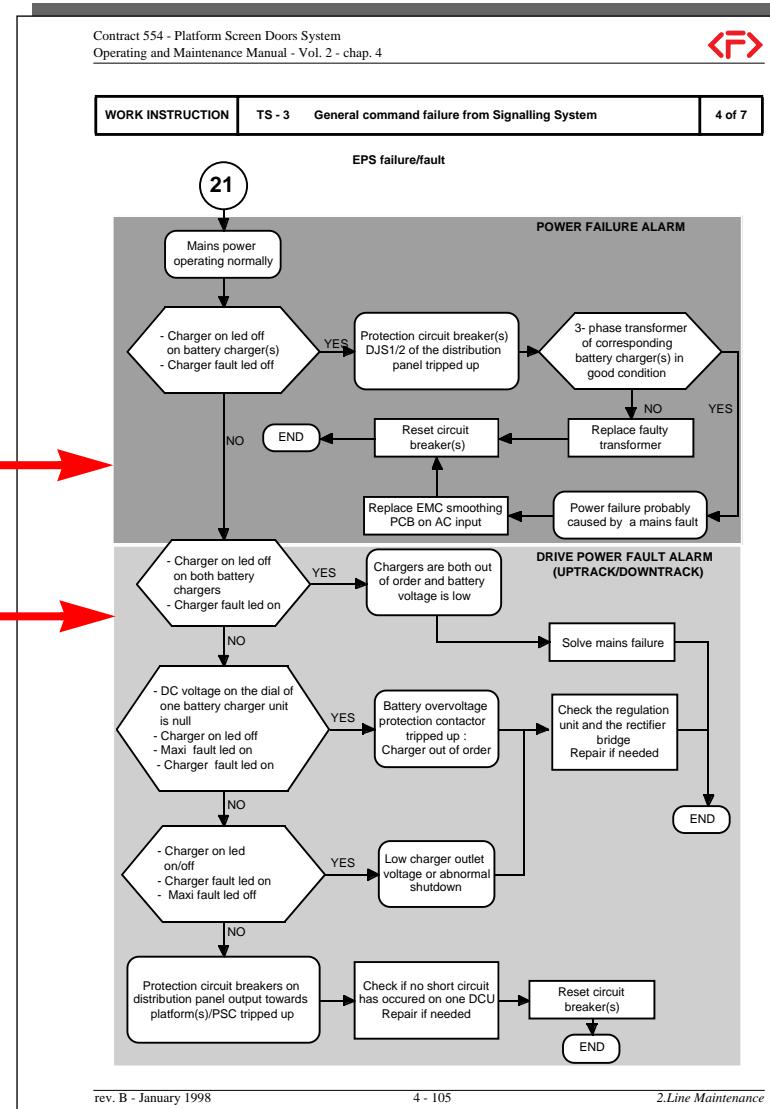
rev. B - January 1998 4 - 101 2 Line Maintenance

Troubleshooting (3/5)

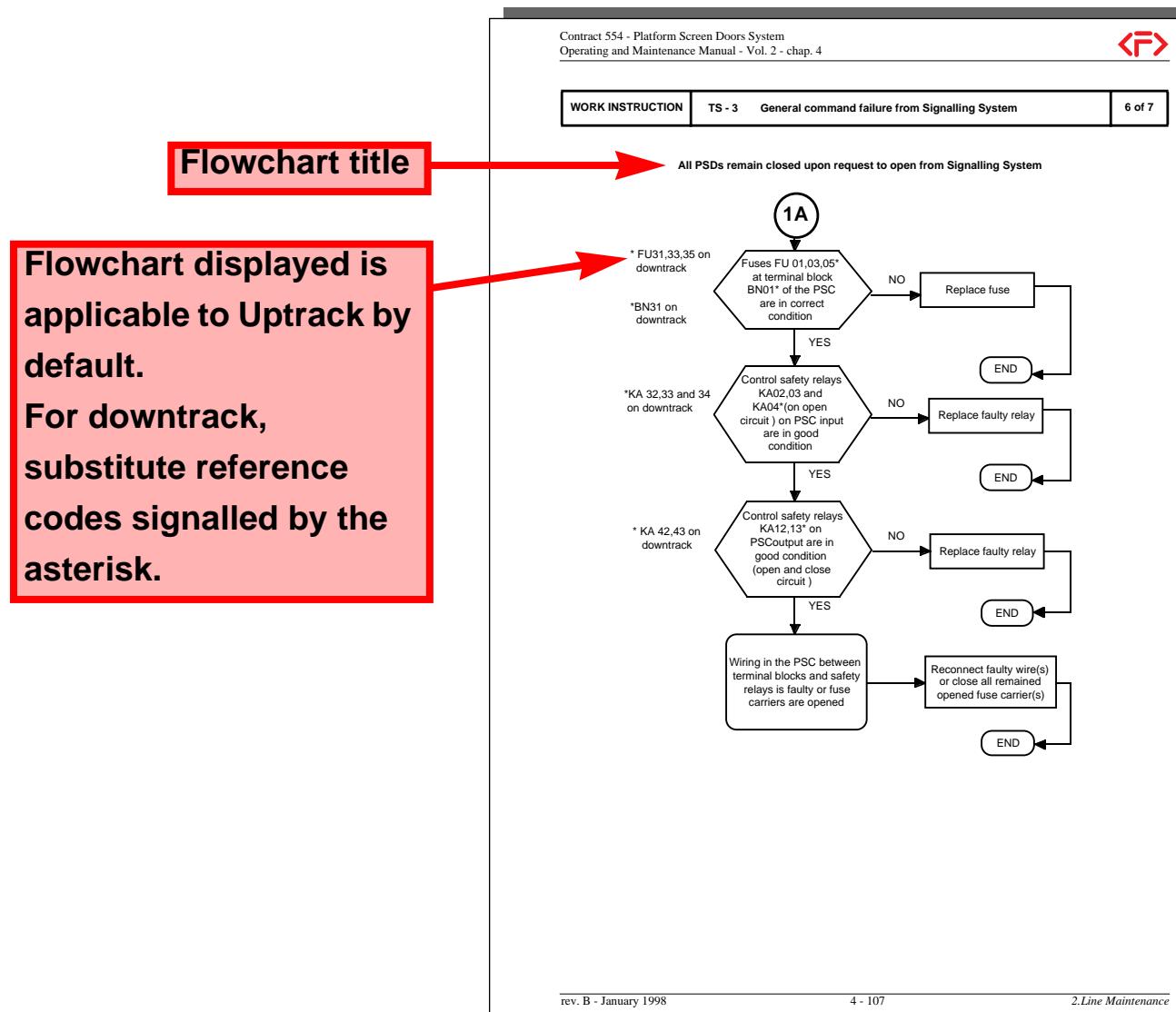


Troubleshooting (4/5)

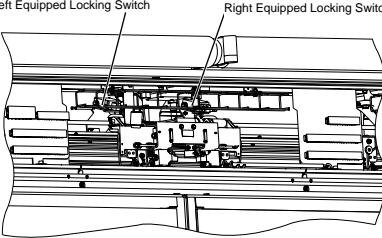
Apply the flowchart in accordance with the alarm raised
 Note : if no alarm goes off when power supply fails, require FAIVELEY'S assistance.



Troubleshooting (5/5)



Dismounting / Mounting - Electromechanical LRU (1/3)

Work instruction identification	Title	Page
Contract 554 - Platform Screen Doors System Operating and Maintenance Manual - Vol. 3 - chap. 4	DM - 18 Equipped Locking Switch	1 of 3
Scope of application This procedure is applicable for both right and left Equipped Locking Switches.	1 Application	
Statement of the LRU location, function and versions, this work instruction is applicable to	The Equipped Locking Switch is located in the central section of the Header Box. Its function is to give the information that the leaf is locked. There are two Equipped Locking Switches: one for the right mechanism and another one for the left.	
Requirement of the proficiency and number of personnel for the performance of the work	Left Equipped Locking Switch Right Equipped Locking Switch  figure DM 41 - Header Box general layout	
List of the materials to collect for the performance of the work	2 Operators 1 mechanic 3 Aids Tools: <ul style="list-style-type: none">- step ladder- triangle service key- 4 mm Allen key- magnet shaft- screwdriver 4 Materials <ul style="list-style-type: none">- 1 mm shim 5 Handling Not applicable	
	Drawing/Photograph showing LRU assembly List of standard tools and ancillaries Precautions required for transport, handling and storage	

Preliminary safety guidelines before the performance of the work

Step by step instructions divided in dismounting and mounting sections

Drawing/photograph will help the operator to visualize how the LRU is disassembled / assembled

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION DM - 18 Equipped Locking Switch 2 of 3

6 Safety precautions
Before carrying out these tasks, electrically isolate the door mechanism.

7 Procedure
7.1 Dismounting

1. Open the central access panel.
2. Manually open the Door Leaves.
3. Disconnect the connector of the Equipped Locking Switch.
4. Unscrew the attachment nuts of the Locking Switch support and remove it.
5. Remove the switch cover.
6. Disconnect all electrical terminals inside the switch.
7. Loosen the packing gland, and remove the electrical wiring.

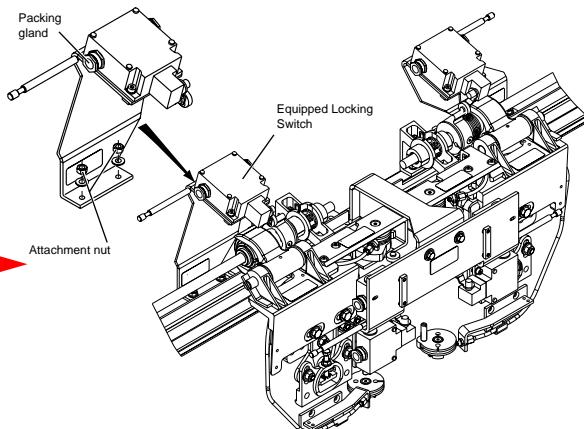


figure DM 42 - Dismounting/Mounting of the Equipped Locking Switch

rev. B - January 1998 4 - 220 2. Line Maintenance

Dismounting / Mounting - Electromechanical LRU (3/3)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4



WORK INSTRUCTION DM - 18 Equipped Locking Switch

3 of 3

7.2 Mounting

1. If not already done, remove the cover of the switch.
2. Connect the previously dismounted electrical terminals, as shown on following figure, and tighten the packing gland.
3. Re-put the cover of the switch.
4. Re-mount the Equipped Locking Switch assembly on the Beam, as necessary use the magnet shaft.
5. Re-connect the connector of the switch.
6. Put a 1 mm shim inside the box stable against the Locking Roller Endstop.
7. Manually close and lock the leaf.
8. Loosen the two screws of the switch, and move the switch so that it is activated (verify that it is not in full stroke).
9. Tighten the two screws of the switch.
10. Manually unlock and open the leaf, and remove the shim.
11. Close the central access panel.

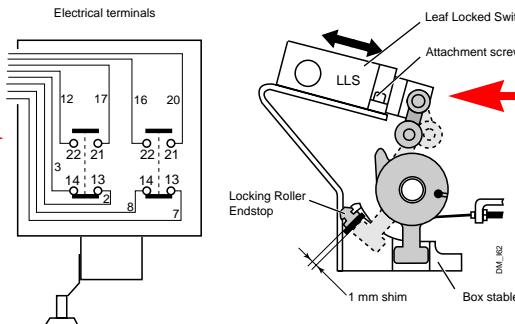


figure DM 43 - Adjustment of the Leaf Locked Switch

Wiring diagram featuring wire and terminal identification (excerpt from doorset mechanism wiring diagram)

All functions linked to the LRU must be checked before door operation resumes.

Illustration showing adjustment method

8 Functional check

Manually lock and unlock the Locking Roller, and verify that the Leaf Locked Switch is correctly activated (ISOLATED mode selected on the local manual command device).

rev. B - January 1998

4 - 221

2. Line Maintenance

Dismounting / Mounting - Electrical LRU (1/3)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION DM - 75 HPT 833/834 Pilot unit 1 of 3

1 Application

HPT 833/834 Pilot unit is installed in uptrack and downtrack EPS charger units. A different version is available on AEL and TCL lines

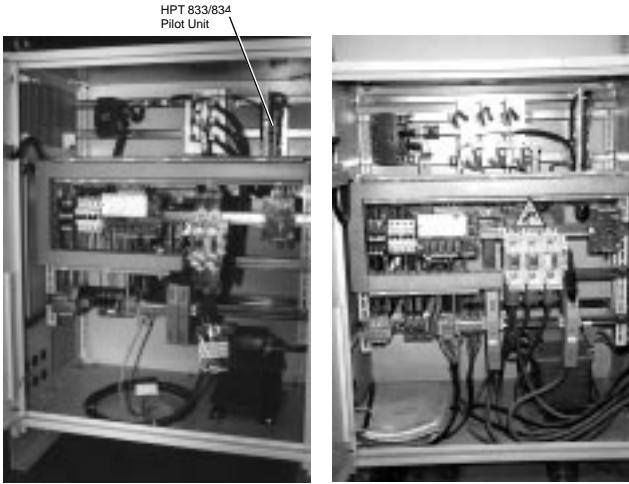


figure DM 181 - Position of the HPT 833/834 pilot unit

2 Aids

Tools:

- Small and medium flat screwdrivers,
- Set of locking keys for EPS.

3 Materials

Not applicable

4 Handling

Not applicable

rev. B - January 1998 4 - 391 2. Line Maintenance

Dismounting / Mounting - Electrical LRU (2/3)

Preliminary shutdown instructions prior to the performance of the work

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

〈F〉

WORK INSTRUCTION DM - 75 HPT 833/834 Pilot unit

2 of 3

5 Safety precautions

To electrically isolate one charger unit:

- Push down IM switch located on charger front panel display and control led status on signalling PCB:
 - "Charger on" green led is off
 - "Charger fault" red led is on
- Open the designated charger cabinet and trip off the fuse switch IFB in order to disconnect the battery blocks from the charger.

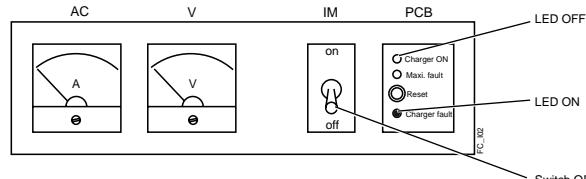


figure DM 182 - Front panel status during charger shutdown

6 Procedure

6.1 Dismounting

- on HPT 833:
 - Pull out the Faston terminals of wires 4 to 8.
 - Disconnect the wires 27 to 34 from terminals on PCB.
- on HPT 834:
 - Pull out the 15 points connector.
 - Unscrew the two attachment screws holding up the HPT 833/834 supporting bracket.

⚠ Make sure not to lose the identification bushing.

⚠ The printed card boards shall not be disassembled separately from the bracket.

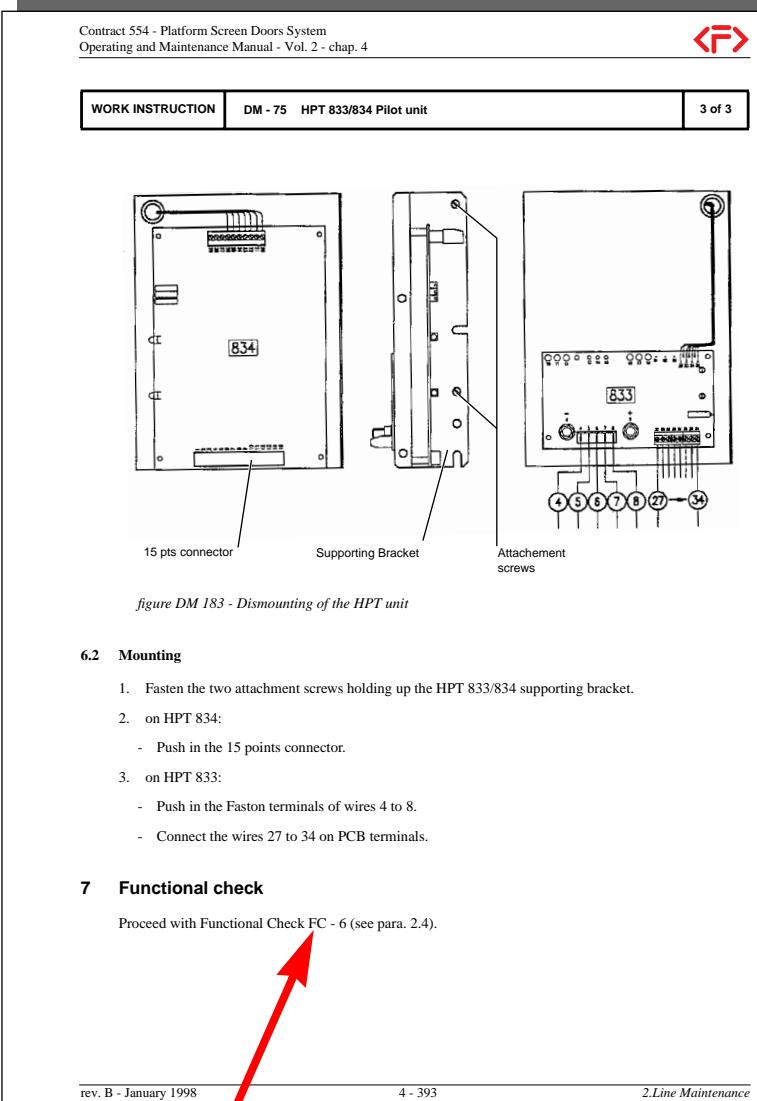
Safety warnings are inserted in item 6 where appropriate

rev. B - January 1998

4 - 392

2. Line Maintenance

Dismounting / Mounting - Electrical LRU (3/3)



Work instruction FC-6 is cross referenced (interactive zone)
Go to paragraph 2.4 "Functional check" and follow
procedure FC-6 where applicable

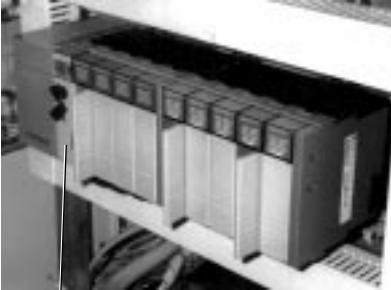
Dismounting / Mounting - Electronical LRU (1/4)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION DM - 86 SLC 5/04 Control Processing Unit module 1 of 4

1 Application

The MCSI CPU is located in the MCSI chassis in between the power supply and input modules. Its function is to process controlling data on input and output. The CPU interfaces with all I/O and modbus communication modules and monitors data transfer errors.



Control Processing Unit

figure DM 204 - SLC 5/04 CPU in MCSI general layout

2 Operators
1 electromechanic

3 Aids
Tools:
- locking key of the PSC cabinet,
- medium flat head screwdriver (*when needed*).

4 Materials
Not applicable

5 Handling
Not applicable

rev. B - January 1998 4 - 431 2.Line Maintenance

Dismounting / Mounting - Electronical LRU (2/4)

In one procedure, are grouped all LRUs. Scan through each paragraph to select the right unit.

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION DM - 86 SLC 5/04 Control Processing Unit module 2 of 4

6 Safety precautions
Do not expose processor modules to surfaces or other areas that may typically hold an electrostatic charge. Electrostatic can alter or destroy memory.

7 Procedure
7.1 Replacing a processor module or FlashEPROM

7.1.1 Dismounting
1. Open the front door of the PSC cabinet.
2. Cut energy of the MCSI power supply by opening fuse terminals 1 (+24 VDC) and 2 (DC neutral) at BN06, inside PSC.
⚠ Failure to turn off incoming power before disconnecting processor could cause injury to equipment
3. Press both top and bottom retainer clips and slide out the module from its rack (slot 0).
4. Grasp both extremities of the Flash EPROM with your thumb and index fingers, then gently but firmly lift upwards on either end.
5. When one end is partially raised, begin lifting the other end in the same manner. Repeat this until the Flash EPROM module has been completely removed from its socket.
⚠ Do not expose Flash EPROM modules to surfaces or other areas that may typically hold an electrostatic charge.

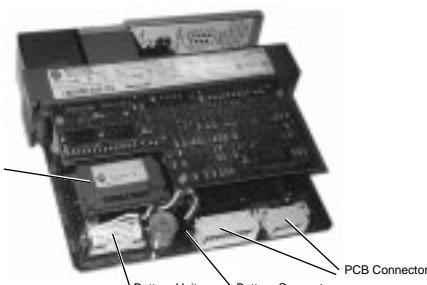


figure DM 205 - Sideview of the SLC 5/04 circuit board

rev. B - January 1998 4 - 432 2. Line Maintenance

Case ①

Dismounting / Mounting - Electronical LRU (3/4)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION DM - 86 SLC 5/04 Control Processing Unit module 3 of 4

7.1.2 Mounting

1. Change or install FlashEPROM on the socket of the new CPU module. Make sure a battery is already installed on the spare unit.
2. Align the circuit board with the card guide in slot 0 of the chassis. Slide the module in until connectors grip in their sockets and retainer clips are secured.

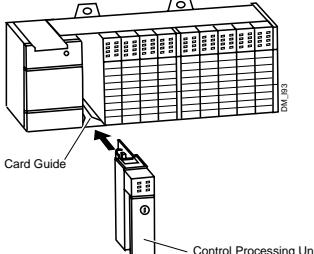


figure DM 206 - CPU installation on rack

Case ② → **7.2 Replacing a battery on circuit board**

SLC 5/04 processor provides back-up power for RAM through a replaceable lithium battery. This battery provides back-up for approximately 2 years. A BATT LED on the front of the processor alerts you when battery voltage is low.

To replace the lithium battery, follow these steps.

1. Open the front door of the PSC cabinet.
2. Cut energy of the MCSI power supply by opening fuse terminals 1 (+24 VDC) and 2 (DC neutral) at BN06, inside PSC.

⚠ Failure to turn off incoming power before disconnecting processor could cause injury to equipment

3. Press both top and bottom retainer clips and slide out the module from its rack (slot 0).
4. Unplug the battery connector (See figure DM 205 for connector location).

Note: the processor has a capacitor that provides at least 30 minutes of battery back-up while the battery is disconnected. Data in RAM is not lost if the battery is replaced within 30 minutes.

5. Remove the battery from the retaining clips.
6. Insert a new battery into the battery retaining clips.

rev. B - January 1998 4 - 433 2. Line Maintenance

Dismounting / Mounting - Electronical LRU (4/4)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 2 - chap. 4

WORK INSTRUCTION DM - 86 SLC 5/04 Control Processing Unit module 4 of 4

Case ③ →

7.3 Replacing a retainer clip

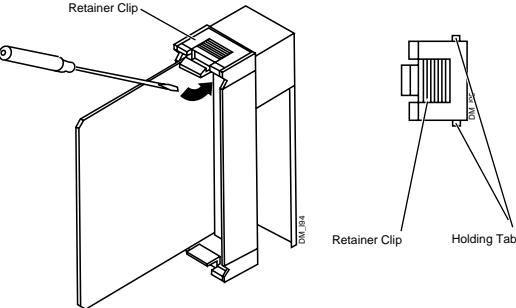
Use only lithium battery of the type and rating specified for the unit.

7. Plug the battery connector back in its socket.
8. Re-insert the processor module as detailed above

8 Functional check

Proceed with paragraph 3.1 of functional check work instruction FC - 10.

figure DM 207 - retainer clip installation on module



rev. B - January 1998 4 - 434 2-Line Maintenance

Only paragraph 3.1 of work instruction FC-10 shall be applied

Functional check (1/5)

Proficiency and number of personnel required for the performance of the work

Location of the system where the tasks shall be performed

List of all tools to collect, for the performance of the work

Diagram of principle designed to clarify plugging configuration of the laptop computer on the DCU

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION FC - 2 Obstacle detection functional check 1 of 5

1 Operating requirements

Operators: 2 electromechanics:
- 1 knowledgeable in the DCU parameter adjustment software (P.A.S)
- 1 knowledgeable in PSCD software use for maintenance data processing (if testing on RS485 serial link is necessary)

Location: - 1 at required Header box
- 1 at doorset and ultimately in Cabinetry room at PSC if needed (either uptrack or downtrack PSC at Lai King)

Tools: at Header box:
- service triangle key,
- local command selection key,
- step ladder,
- stopwatch,
- RS485 dummy connector,
- laptop computer plugged on designated DCU (equipped with PAS software on Windows 95),
- talkie walkie (if needed),

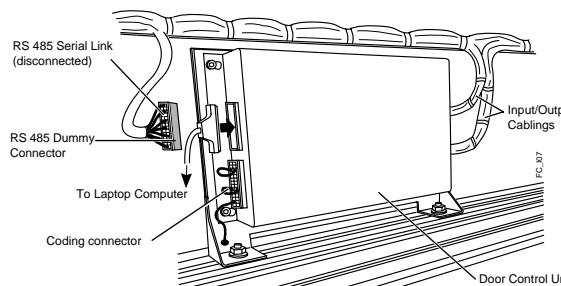


figure FC 4 - Plugging to Door Control Unit (DCU)

rev. B - January 1998 4 - 460 2. Line Maintenance

Functional check (2/5)

Plugging configuration of the laptop computer on PSC.

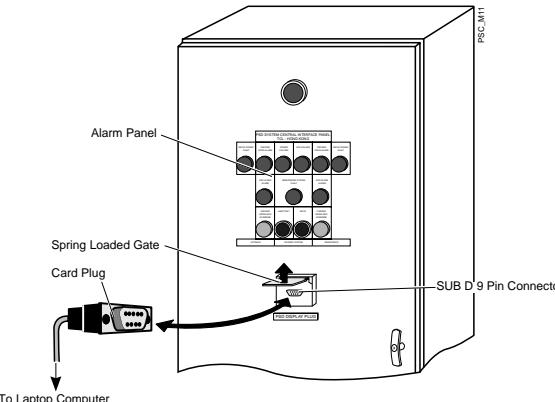


figure FC 5 - Plugging to PSC Front Panel

Applicable documents: - Monitoring system PSCD user's manual STF 554.870
- Parameter Adjustment Software user's manual STF 554.872
- DCU input parameter label (on box case front)

Preliminary safety action to read before the performance of the work

Books to collect prior to intervention

2 Safety precautions

at Header box:

- Operate indicated doorset from the manual local command box during the whole intervention.
- Beacon the area for intervention during operating hours.

rev. B - January 1998

4 - 461

2. Line Maintenance

Functional check (3/5)

Step by step instructions illustrated with photographs/ drawings where appropriate

Work phase 1 (door control check)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION FC - 2 Obstacle detection functional check 3 of 5

3 Procedure

3.1 at Header box

1. Open the right overhead access panel (except at both ends of the BHA where local command device are installed in remote box casing) by use of the service triangle key.
2. Insert local command selection key in the manual local command device keyslot and select MANUAL mode.

Manual Local Command Device

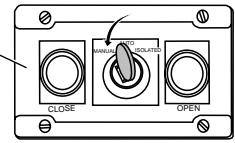


figure FC 6 - Manual Local Command Device

3. Open the doorset.
4. The doorset being opened, initiate closing while inserting the 8 x 40 mm plate at a height of 1 m from threshold, in the middle of the doorway.

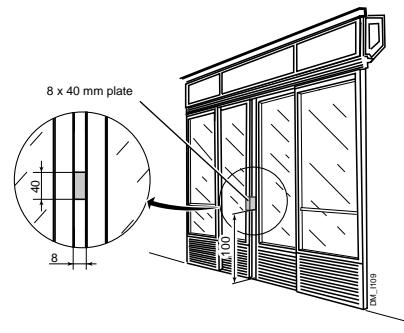


figure FC 7 - Obstacle detection

rev. B - January 1998 4 - 462 2. Line Maintenance

Functional check (4/5)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION FC - 2 Obstacle detection functional check 4 of 5

5. Verify by use of the stopwatch the doorset is no more powered for 2s and can be manually slid opened during this delay.

6. Remove the plate from the door path and verify that both leaves close and lock correctly after second automatic attempt to close.

7. Re-open the doorset.

8. The doorset being opened, initiate a re-closing and provoke an obstacle detection .

9. Verify that each DCU at doorset carries out three successive closing cycles and then leaves the door leaf in an unpowered free-wheeling state. Time by use of a stopwatch.
Motion of both leaves must be coordinated, even though it is not really synchronous.

Proceed with troubleshooting work instruction **TS - 12** if door does not react correctly.

10. Check obstacle detection parameter adjustment inputs on DCU in use a gap exists between nominal and recorded values (effort + release time, number o.d) by means of the laptop computer.
Reset parameter value if not compliant with logbook records or proceed by replacing misconfigured DCU.

⚠ Parameter adjustment software operation at DCU requires to plug in a dummy connector on RS 485 serial link towards MCS1. Restore RS 485 communication link when intervention is completed.

11. Close and lock the doors manually.

12. Reopen the doorset.

13. The doorset being opened, initiate a re-closing and provoke an obstacle detection.

14. When leaves are in an unpowered free wheeling state, push manually one door wide opened in order to dephase DCU's position locating.

15. Control that indicated door re-closes at slow speed at second closing cycle, and opposite door locks normally.

16. Operator 2 heads toward the Cabinetry room to join the PSC, while operator 1 stays up on step ladder to command O/C from the manual local command device. Talkie walkie are switched on and a bulky object is left on door path.

17. Switch back selection key to AUTO mode and remove key, on completion of operator 2 task.

18. Close and lock overhead access panel.

rev. B - January 1998 4 - 463 2. Line Maintenance

Work instruction TS-12 is cross referenced (interactive zone).
Go to paragraph 2.2 "Trouble shooting" and follow procedure TS-12 where applicable.

Functional check (5/5)

Work phase 2 (carried out with PSCD down loaded on the laptop computer)

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION FC - 2 Obstacle detection functional check 5 of 5

3.2 at PSC

1. Select "door leaf status" display on laptop computer at required DCU,
2. Give O/C orders to operator 1 as needed,
3. Check lighting up of the following leds while DCU interlocks obstacle detection mode:
 - Local control
 - Close local (*when the operator is pushing the CLOSE button*)
 - In / Out leaf state
 - In / Out leaf obstacle detection (*extinguish when door re-closes and locks*)
 - Obstacle detection (closing) (*extinguish when door re-closes and locks*)

Note : lighting up of obstacle detection (opening) led may be checked during open sequence although this function is not required in the scope of the contract.

4. Check at bottom of the display, that closing time + average current squares remain grey.
5. Verify "door leaf status" display recovers into automatic mode, when key is switched back at manual local command device.

rev. B - January 1998 4 - 464 2. Line Maintenance

Workshop Maintenance (1/3)

Work instruction identification

Work task

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

<F>

WORK INSTRUCTION

WM - 2 PSD/PED Equipped Driving Screw - Repair

1 of 3

1 Application

- The Equipped Driving Screw is a part of the Drive Mechanism Assembly. Each PSD or PED Header Box comprises one Left- and one Right Driving Screw.
- This work shall be carried out on a previously removed Driving Screw (see instruction DM - 1 or DM - 39).
- Left- and Right Equipped Driving Screws are different; however, this instruction is applicable for both.

2 Operators

1 workshop mechanic

3 Aids

Tools:

- Hook spanner for slotted round nut
- External bearing extractor
- Soft & clean lint-free cloth
- Brush

4 Materials

Consumables:

- Grease Bardahl HR 160; approx qty: 3 cu. cm
- Petroleum or any adapted degreasing agent

Replacement parts:

- 1 Spherical Ball Bearing
- 1 Locking Spring
- (as necessary) fasteners

and, if replacement needed:

- 1 Locking Roller
- 1 Elastic Ring
- 1 Central Plastic Ring

(for part numbers, refer to Spare Parts Catalogue)

5 Procedure

5.1 Disassembly



Do not remove the Driving Nut from the Driving Screw!
The screw and the ball nut are manufactured together, and can only be replaced together.

- Maintain the Equipped Driving Nut in position by gripping the cam with soft jaws.
- Remove the round slotted nut.

**List of SRUs:
which for replacement
is compulsory or
occasional**

**Scope of application
for the work**

**Theoretically,
workbench, vice or
trestles are supplied**

**General warning to
read before
disassembly**

rev. B - January 1998

4 - 492

3. Workshop maintenance

Workshop Maintenance (2/3)

SRUs to be replaced
are clearly shown
dismounted on the
LRU

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION WM - 2 PSD/PED Equipped Driving Screw - Repair 2 of 3

3. Extract the Spherical Ball Bearing from the nut body.
4. Remove the Locking Spring.
5. Proceed with a carefully cleaning of the Driving Screw and the nut body: remove old grease with petroleum and wipe out.

⚠ Do not proceed with any further dismounting.

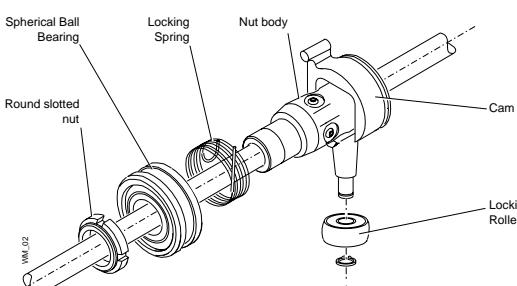


figure WM 2 - Equipped Driving Nut

Notes:

- Check the Locking Roller for seizing or irregular rotation, and replace it if needed, with its Elastic Ring.
- Check the Central Plastic Ring of the Central Bearing for wear or damage, and replace it if needed.

In these cases, refer to corresponding Dismounting & Mounting Instructions in chapter 2.3.

rev. B - January 1998 4 - 493 3. Workshop maintenance

Workshop Maintenance (3/3)

Instructions shall preferably be carried out on the drive mechanism test bench where available

Contract 554 - Platform Screen Doors System
Operating and Maintenance Manual - Vol. 3 - chap. 4

WORK INSTRUCTION WM - 2 PSD/PED Equipped Driving Screw - Repair 3 of 3

5.2 Reassembly

Notes:

- Discard Bearing, Spring and round nut, and remount new parts.
- Select the right Locking Spring: The springs for Left- or Right Driving Screws are different, but look alike; see figure WM 3.

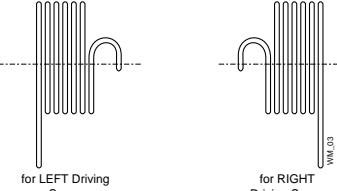


figure WM 3 - Left and Right Locking Springs

1. As for dismantling, maintain the nut body in position by gripping the cam with soft jaws.
2. Slightly grease the nut body on the spring mounting area, and insert the Locking Spring around the body so that the hook catches on the roller arm.
3. Mount the Spherical Ball Bearing, after having slightly greased its mounting diameter.
4. Fit the slotted round nut, and tighten.
5. Slightly grease the outside ring of the bearing (for protection).
6. Proceed with greasing of the Driving Screw: see figure WM 4; make the Driving Nut travel a few times in both directions along the full length.
7. Remove the excess of grease.

Notes: If the Locking Roller and/or the Central Plastic Ring must be exchanged, refer to corresponding Dismantling & Mounting Instructions in chapter 2.3.

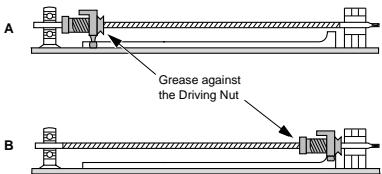


figure WM 4 - Greasing of the Driving Screw

rev. B - January 1998 4 - 494 3. Workshop maintenance

1.4 Maintenance applicable documents

A. Maintenance Drawings

Mechanical drawings



Wiring diagrams



B. Original supplier Operation/User's manuals

PSCD User's Manual



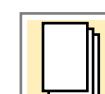
PAS User's Manual



*SLC 500 Installation &
Operation Manual*



*Modbus Communication
Module - User's Manual*

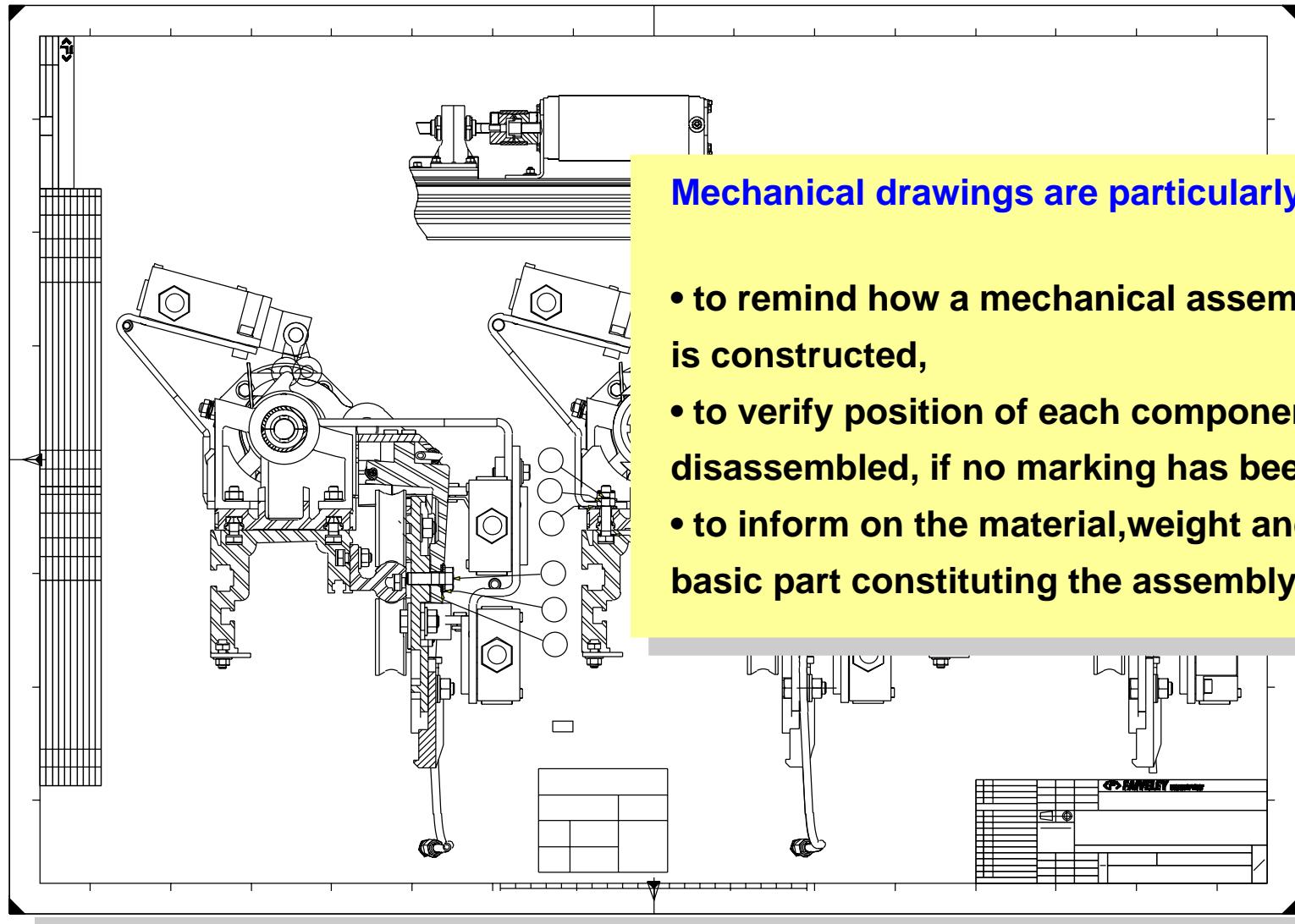


C. Technical Data Sheets

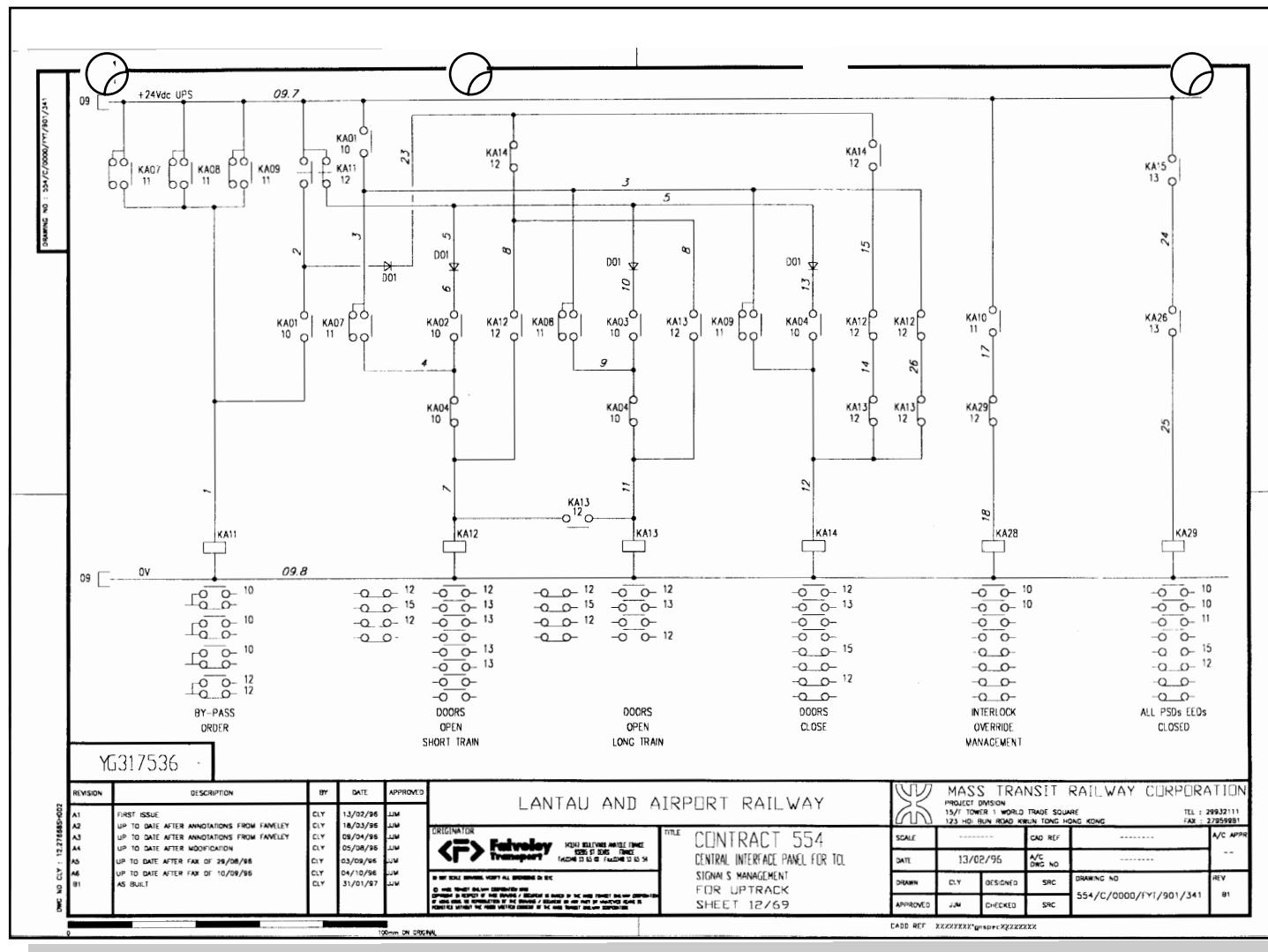


A. Maintenance drawings

Mechanical drawings



Wiring diagrams



Power supply cabinets/
Electrical panels...



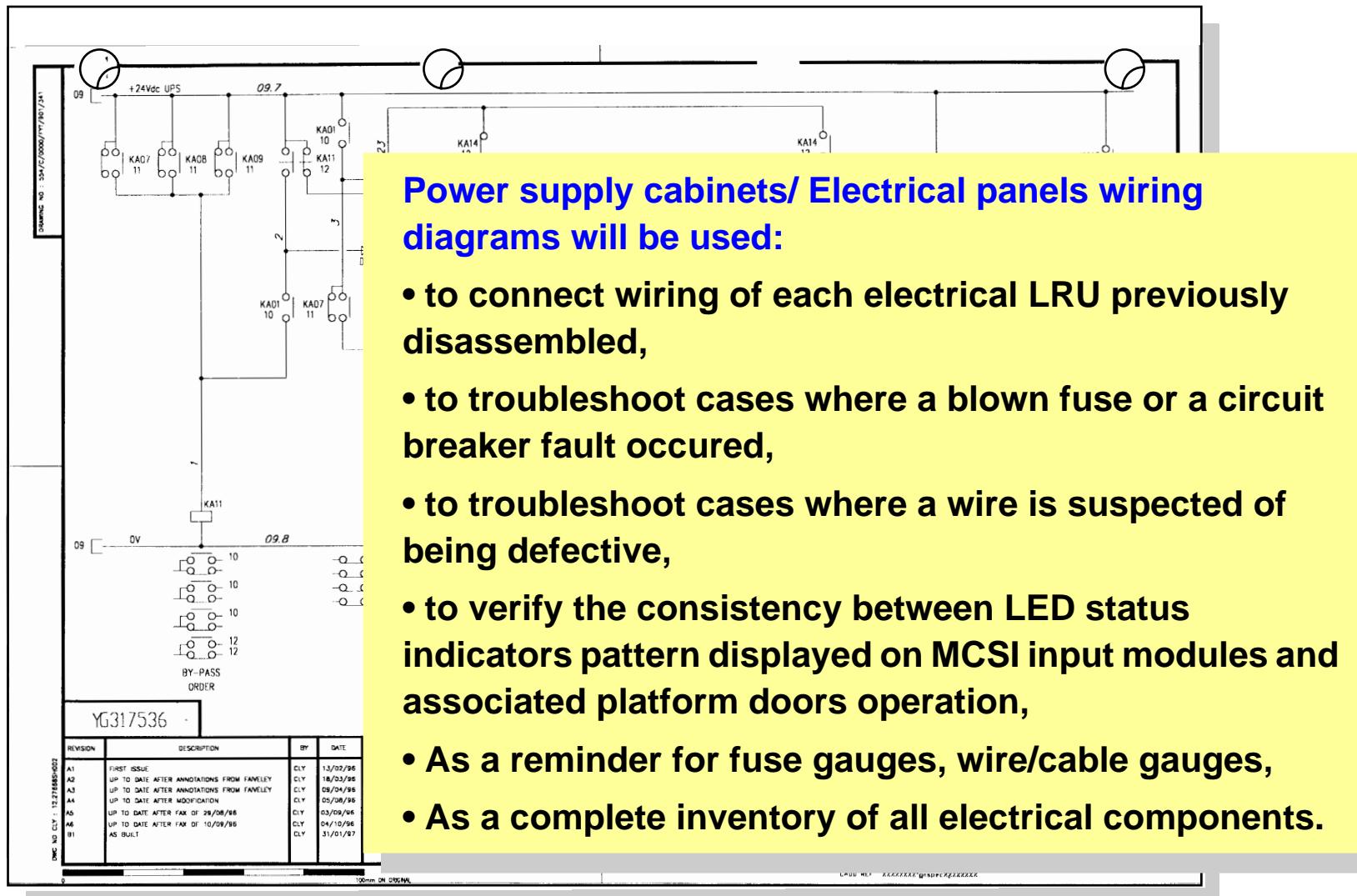
Doorset mechanism/
Bubble...



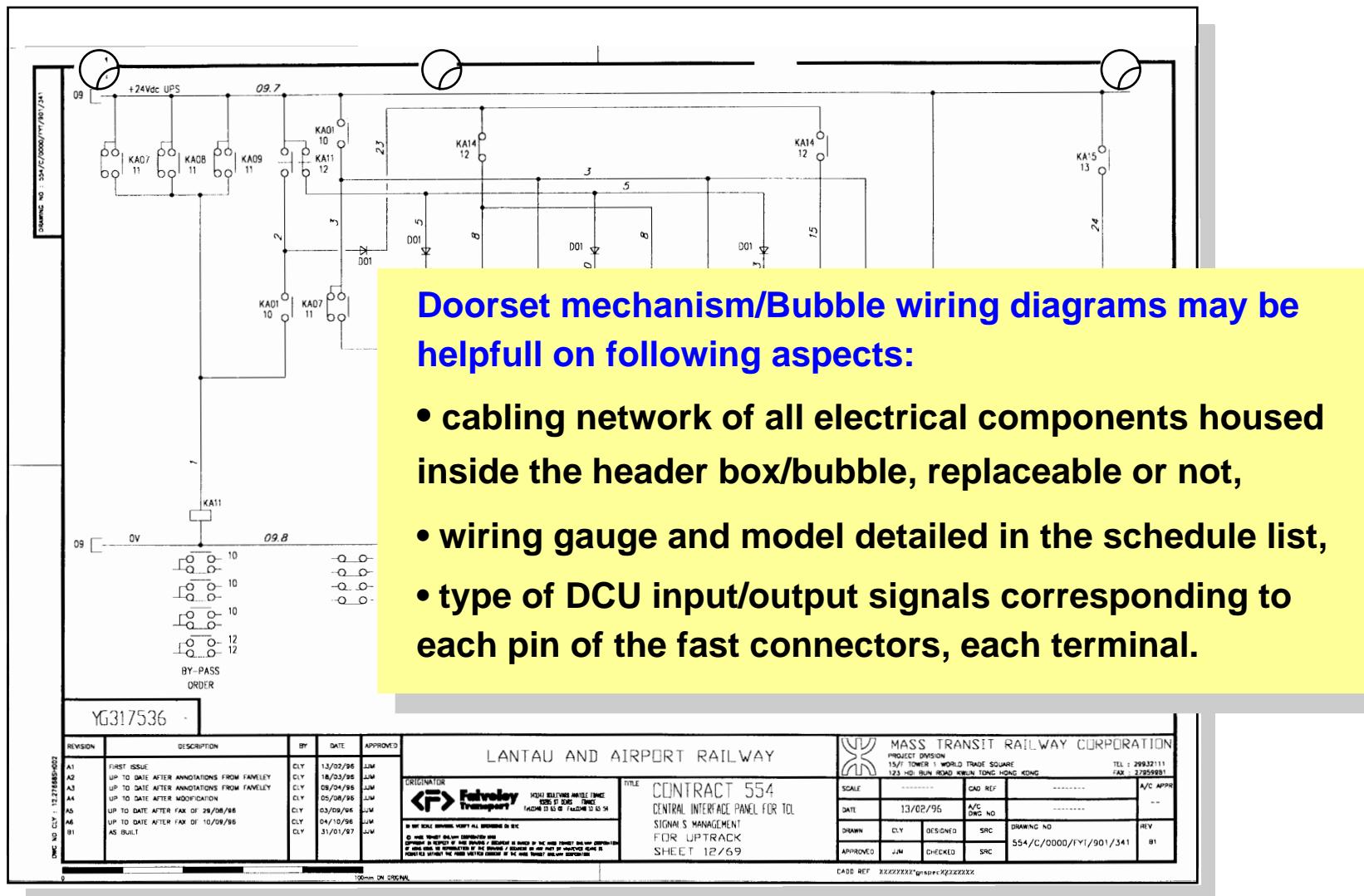
Platform cabling
network...



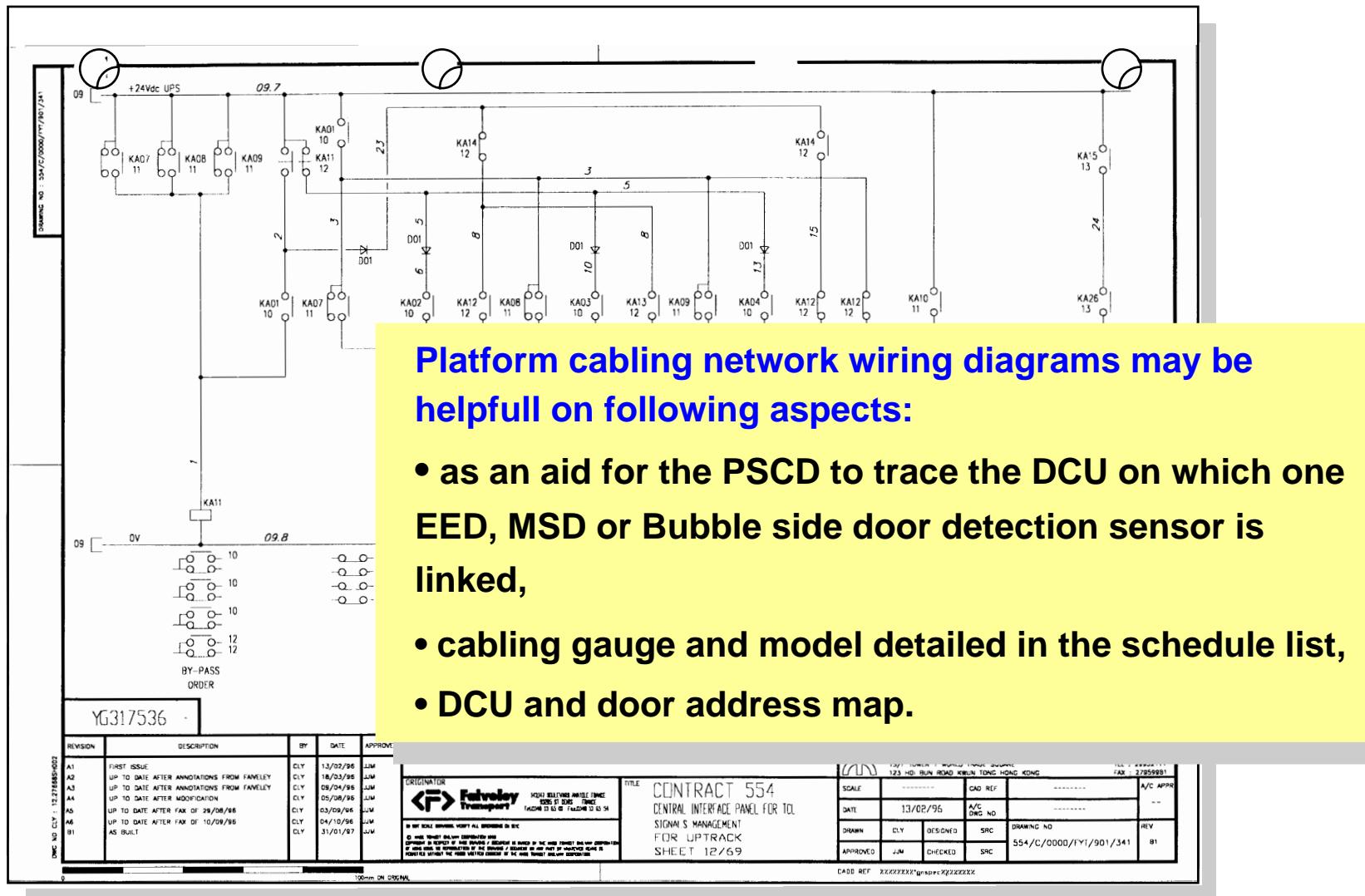
Wiring diagrams



Wiring diagrams



Wiring diagrams

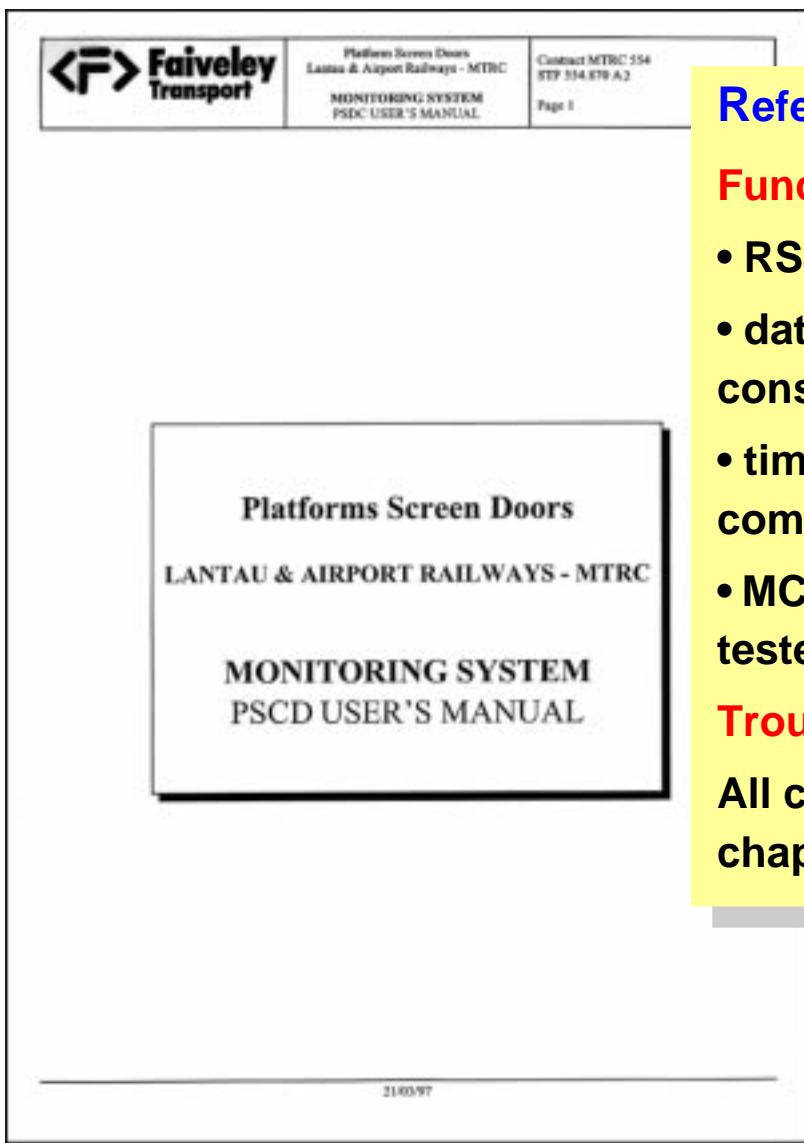


Platform cabling network wiring diagrams may be helpful on following aspects:

- as an aid for the PSCD to trace the DCU on which one EED, MSD or Bubble side door detection sensor is linked,
- cabling gauge and model detailed in the schedule list,
- DCU and door address map.

B. Original supplier Operation/User's manuals

PSCD user's manual



Reference to this book is made when:

Functional check

- RS485 serial link of the DCUs is tested,
- data displayed on the laptop computer must be consistent with actual station / door leaf status.
- times of manoeuvre displayed on the laptop computer are recorded,
- MCSI internal data transfer or DH+ biaxial cable is tested.

Troubleshooting

All cases of failure listed in the PSCD description chapter, when applicable.



Platform Screen Doors
Lantau & Airport Railways - MTRC
Parameters Adjustment Software
P.A.S.
User's manual

Revision A.2
Page 1/13

Platform Screen Doors
LANTAU & AIRPORT RAILWAYS
PARAMETERS ADJUSTMENT
SOFTWARE
P.A.S
USER'S MANUAL

19/06/97

Reference to this book is made when:

Functional check

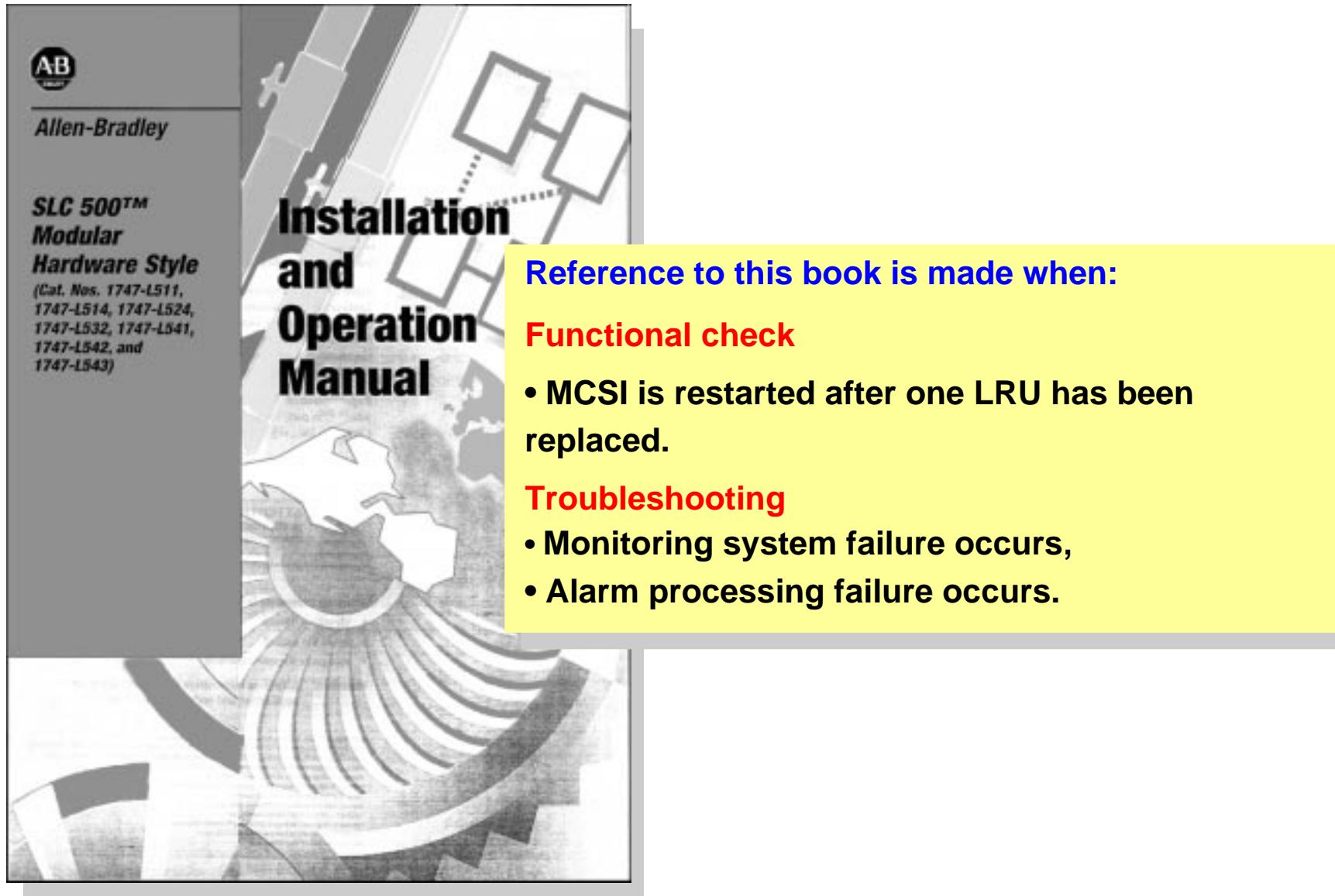
- Door operation profile is tested and not satisfactory

Troubleshooting

- Maintenance crew proceeds to parameter download on new DCU, in compliance with the list of preset values written on the label.

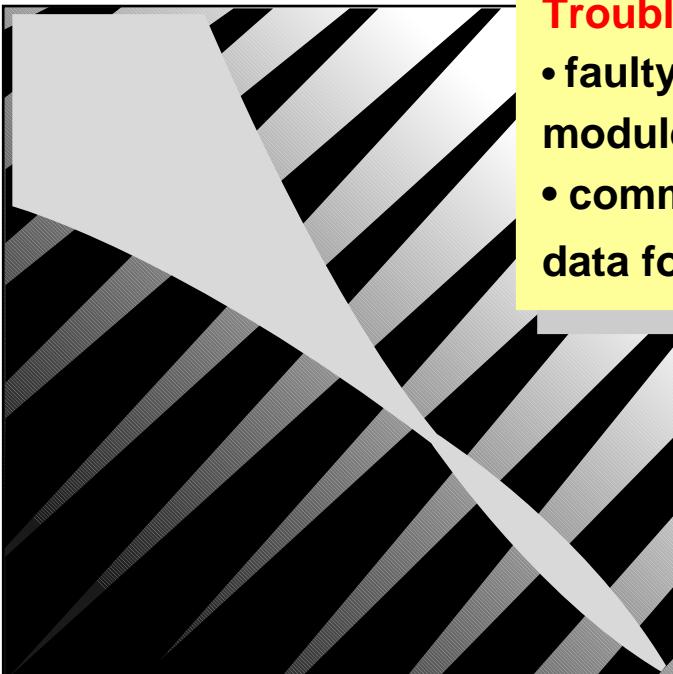
Note:

It is reminded that the label stuck on DCU box case, must display only updated input values.





3100/3101-MCM
Revision 1.4
3150/3151-MCM
Revision 1.4
January 1996



Reference to this book is made when:

Troubleshooting

- faulty LED status mode displayed at one modbus module,
- communication link to MCS is not transferring data for all PSD/PEDs. Information are missing.

C. Technical data sheets



Among the topics treated in this chapter, are included:

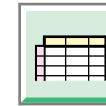
- PSC internal components (relays, EMC filter, diode gate, etc.),
- Power Supply internal components,
- Battery unit,
- Power Supply cards (867, 833, 914, 868)

Example: technical data sheet for push button

1. General
2. Safety guidelines
3. Specific tools and equipment

2.1 Safety precautions during intervention

On platform



In Equipment Room (ER)



In Cabinetry Room (CR)



PM, TS, DM and FC correspond to the abbreviations used for the Work Instructions

A. On platform

n°	Safety / Availability requirement	Task	PM	TS	DM	FC
1	<p>Cut temporarily energy at one doorset to allow a safe intervention of the maintenance crew locally.</p>	<p>Select ISOLATED mode with the keyswitch at manual intervention box to isolate the doorset</p> <p>Beacon the area for intervention during operating hours</p>	√	√	√	
2	<p>Operate at will one doorset independently from the rest of the system</p>	<p>Select MANUAL mode with the keyswitch at manual intervention box to locally operate the DCUs</p> <p>Beacon the area for intervention during operating hours</p>	√	√		√
3	<p>Protect the maintenance crew from electrocution hazard / train traffic, when they intervene on track</p>	<p>Check that overhead line on track is outpowered</p>	√	√		

n°	Safety / Availability requirement	Task	PM	TS	DM	FC
4	Inhibit PSD general commands when maintenance crew is testing PSC circuits	Disconnection of the wires on output at the back of the PSC		✓		
5	Protect the maintenance crew from train generated pressure when EED or PSD/ PED manual release is used	Forbid train traffic during intervention	✓	✓	✓	✓
6	Avoid confusion when reconnecting a relay plugboard	at PEL: Auxiliary relay: follow printed diagram shown on the plugboard body			✓	
7	Protect the maintenance crew from electrocution hazard when they have to replace a wired LRUat PSL,PEL or PSA	at PSC: Open required fuse carrier upstream			✓	

B. In Equipment Room (ER)

n°	Safety / Availability requirement	Task	PM	TS	DM	FC
1	Protect the maintenance crew from electrocution hazard when they have to intervene inside a cabinet	<p>at PSC: Open required fuse carriers upstream</p> <p>at EPS:</p> <p>Shutdown charger unit and possibly distribution panel utilisation output lines</p> <p>Trip off fuse switch to disconnect the batteries from charger circuit</p>	√	√	√	
2	Protect electrical components from any damage caused by mishandling during start up and shutdown of power supply	<p>at EPS:</p> <p>Always install power from the mains towards utilisation outputs during start up and vice versa during shutdown</p>	√	√	√	√

n°	Safety / Availability requirement	Task	PM	TS	DM	FC
3	Avoid confusion when reconnecting a relay plugboard	at PSC: Safety relay: follow hierarchy applied for each level of pins Auxiliary relay: follow printed diagram shown on the plugboard body			✓	
4	Avoid short circuit between batteries when a battery block is disconnected	Ward off the cable connectors from other battery terminals Use protecting gloves	✓		✓	
5	Protect the maintenance crew from electrocution hazard when they have to replace a fuse carrier inside PSC cabinet	at EPS: Switch off EPS circuit breakers associated with the fuse carrier			✓	

n°	Safety / Availability requirement	Task	PM	TS	DM	FC
6	<p>Protect the maintenance crew from electrocution hazard when they have to replace a wired LRU of alarm panel</p>	<p>at PSC: Open required fuse carrier upstream</p>			✓	
7	<p>Protect MCSI electrical components from any damage caused by mishandling during start up and shutdown</p> <p>Power MCSI up and down without disrupting the PSC</p>	<p>Open fuse terminals upstream and downstream of the MCSI for the designated module</p>			✓	

C. In Cabinetry Room (CR)

n°	Safety / Availability requirement	Task	PM	TS	DM	FC
1	Protect the maintenance crew from electrocution hazard when they have to intervene inside UPS cabinet	Shutdown +24Vdc and/or +48Vdc output lines	√	√	√	
2	Protect electrical components from any damage caused by mishandling during start up and shutdown of UPS	Always install power from the mains towards utilisation outputs during start up and vice versa during shutdown	√	√	√	√
3	Protect the maintenance crew from electrocution hazard when they have to replace a fuse carrier inside PSC cabinet	at UPS: Switch off UPS circuit breakers associated with the fuse carrier			√	

2.2 Hazard analysis

Electrocution

As electrical power used on PSD system is of **very low voltage**, risks of electrocution are limited.

Risks although exist if operators accidentally reach contact with **main power supply** or battery connectors. It is therefore necessary to cut off the circuit by mean of **switches and circuit breakers** in the first place, to allow a safe intervention.

- Monitor earth fault alarm on power supply front panel before intervention.
- Require FAIVELEY's assistance if a fault is signalled and do not proceed until the problem has been fixed.

Most of interventions on platform require to be carried out at header box level. It induces a hazard due to the use of **step ladder.**

Thus, special instructions from MTRC must be issued and ladders equipped with adequate **safety features (stability design, non slippery step cover, safety rail).**

Special recommendations must be issued by MTRC in order to prevent any disbalance of the maintenance worker when lifting **heavy or bulky repleacable units from an elevated position.**

Compulsory wearing of **hard hats must of course be considered**

Replacement of worn parts or broken panels introduces specific hazards which could result in cuts to hands.

Wherever possible, the use of protecting gloves and brush must be considered by MTRC.

Nonobservance of the safety precautions applicable to the moving parts of the PSD/PED driving mechanism may result in hard pinching and ultimately trapped finger.

In particular, it is suggested that operator at ground level systematically advises its workmate of any leaf motion in advance.

Heavy parts such as leaves introduce specific potential accidents such as back strain, crushed fingers or toes.

Special recommendations shall be issued by MTRC in such case to:

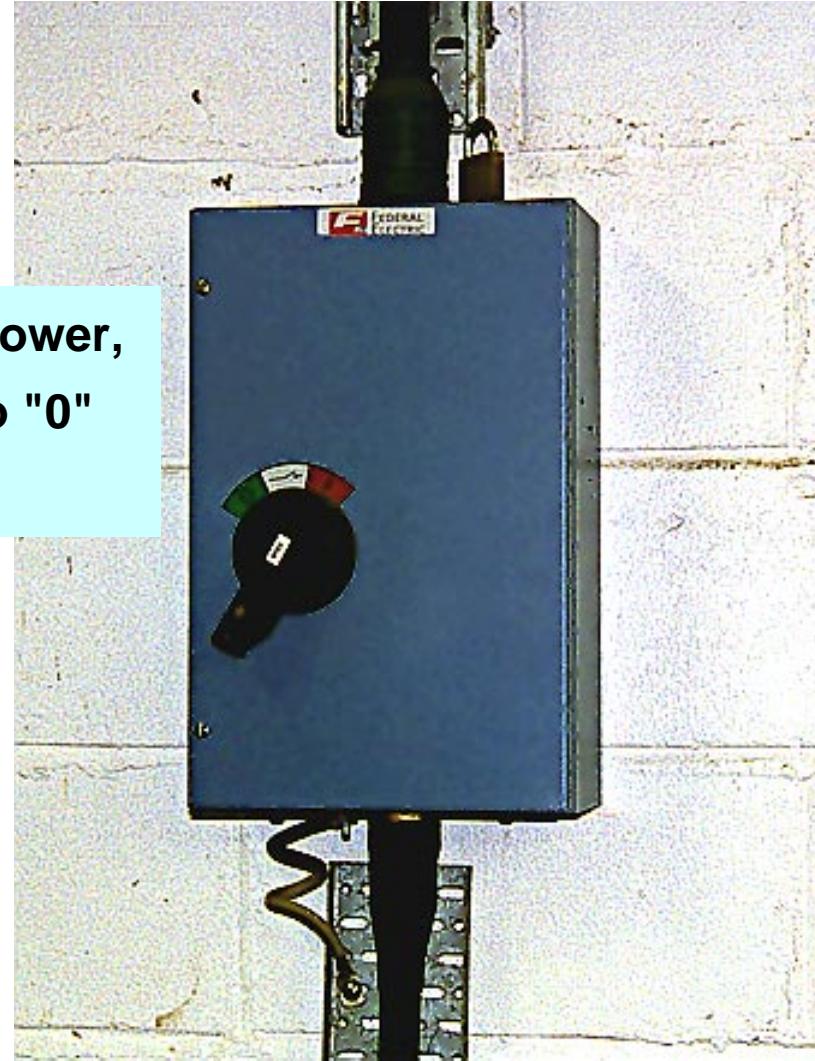
- require the application of adequate lifting procedure,
- recommend the wearing of **protective gloves and shoes.**

Acid leaks from **battery cells** may cause first degree burns to maintenance personnel.

2.3 Emergency cases

Electrocution

In case electrocution is caused by motive power, turn the wall mounted mains commutator to "0" position before helping the victim.



Mains commutator

A fall on track is conceivable in case of non observance of the safety precautions recommended in the O&M manual:

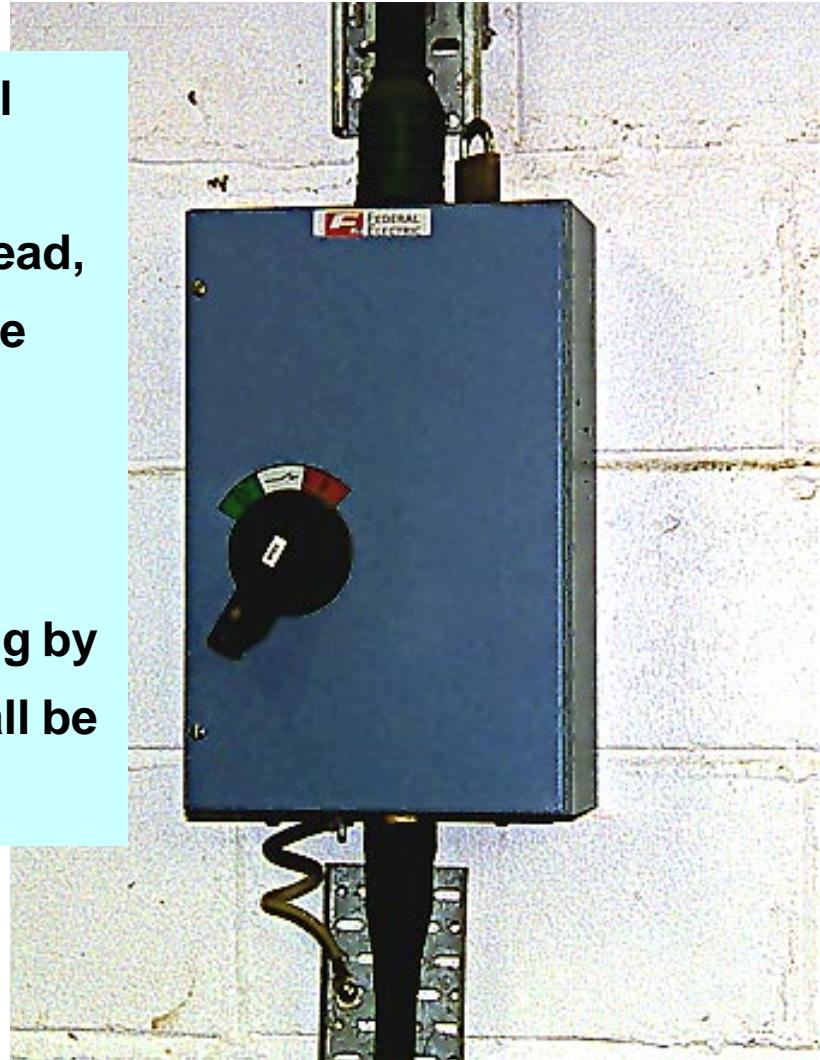
An operator might be swept and put out of balance when standing in the doorway or an untimate opening might occur while someone is leaning against a sliding door.

Recommended actions depend on the options retained by MTRC for PSD system service. Thus, apply **MTRC safety rules in such case.**

Fire eruption must be considered in technical rooms.

It is a necessity in order to limitate flame spread, to switch off PSD power supply units from the mains by means of the wall mounted mains commutator selected to position "0".

Proceed immediately after to fire extinguishing by use of the **dry powder extinguisher which shall be at close range.**



Mains commutator

- 1. General**
- 2. Safety guidelines**
- 3. Specific tools and equipment**

Specific tools and Equipment

Tool / Equipment	Application	Characteristics	Accuracy
0,48 Ω resistive bank	Battery charge functional check	Not applicable	
Oscilloscope	Test of the Charger regulation bridge	Digital - Two channels 100 MHz - 1 Gsample/s	To be provided
Capacimeter	Test of the electrolytic capacitors state	To be provided	To be provided
Stabilised portable DC power supply	Electrical units troubleshooting at header box	Range: 0 - 60V • 0 - 50A Power: 1 kW Output impedance: 0,2 m Ω	Regulation: \pm 5mV \pm 5mA Stability: \pm 0,03%
Insulation controller	Insulation test of PSD/PED platform doors in reference to station earth	Gauge: 1000V (500V used) Range: up to 2000M Ω Temperature: 0 - 40°C	Accuracy: \pm 10% \pm 3 digits

Tool / Equipment	Application	Characteristics	Accuracy
Dynamometer	<p>Hand held force gauge equipped with a hook (when pulling) used to evaluate manual effort intensity to release:</p> <ul style="list-style-type: none"> - PSD/PED - EED/MSD 	Range: 0 - 200N	Accuracy: $\pm 10\%$
Cabling + clamps	Wire the insulation controller on the PSD facade	Section: 35 sq. mm	
Set of isolated flat and tubular wrenches	Disconnect the terminals of battery blocks	Base of the tool is wrapped with isolated sheath	
8 x 40 mm plate	Obstacle gauge used for functional check	Material: Steel	